

W 79.1.1.939
W 79.1.1.939

✓


ANNUAL REPORT OF THE
GOVERNOR OF THE
PANAMA CANAL, 1939

386

P187

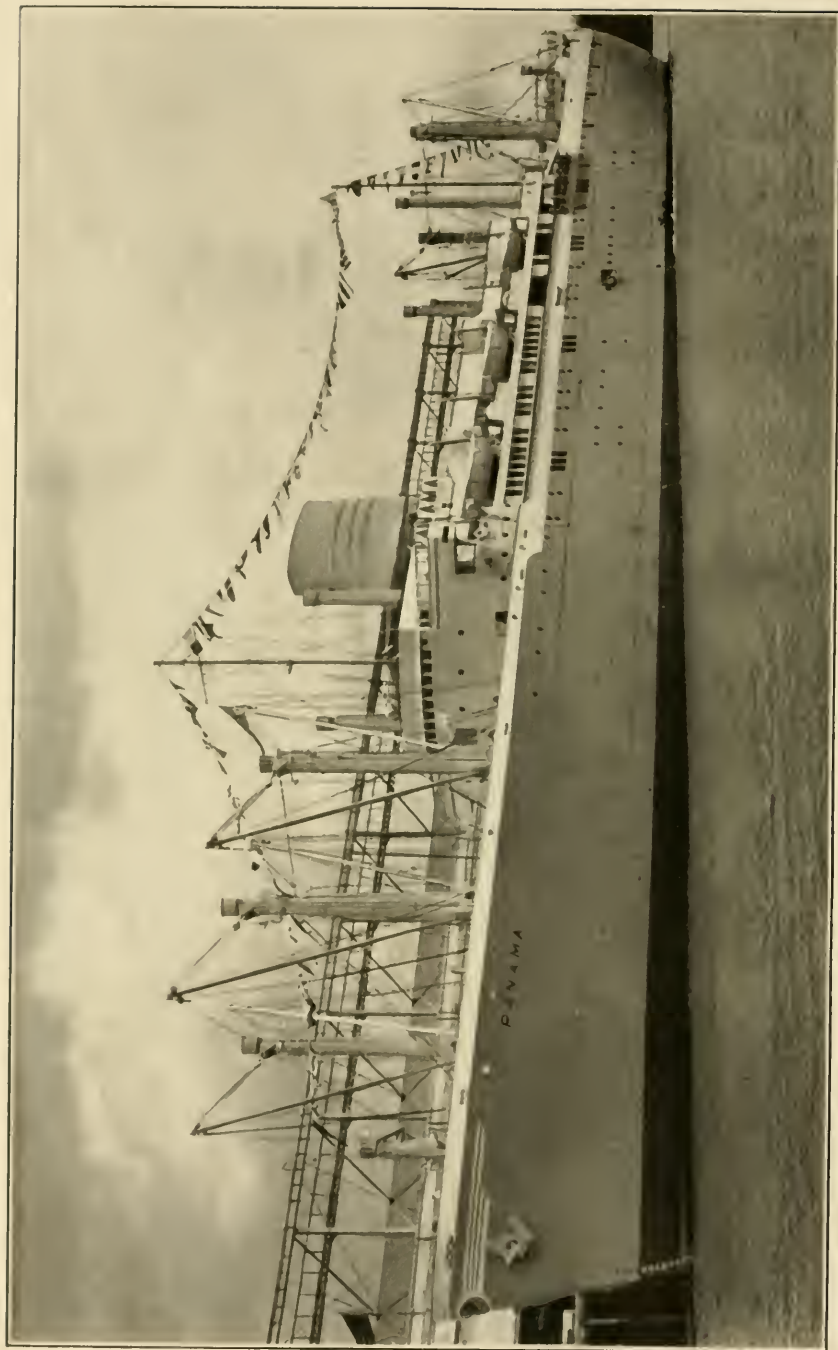
UNIVERSITY
OF FLORIDA
LIBRARY





Digitized by the Internet Archive
in 2010 with funding from

University of Florida, George A. Smathers Libraries with support from Lyrasis and the Sloan Foundation



PANAMA LINE'S NEW STEAMER "PANAMA" AT PORT OF BALBOA, MAY 6, 1939

ANNUAL REPORT
OF THE
GOVERNOR OF
THE PANAMA CANAL
FOR THE
FISCAL YEAR
ENDED JUNE 30
1939



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1940

386
P187

ROYALTY
YR/281

TABLE OF CONTENTS

	Page
Introduction.....	1
Operation and maintenance of the Canal.....	1
Operation of auxiliary enterprises—business operations.....	2
Government—administration.....	2
Services rendered by the Canal to shipping.....	2
Net revenues.....	3
Replacements.....	3
SECTION I.—CANAL OPERATION AND TRADE VIA THE PANAMA CANAL	
Statistics of Canal traffic.....	5
Canal traffic by fiscal years 1915 to 1939.....	9
Traffic by months—fiscal years 1939 and 1938.....	9
Tanker traffic.....	10
Nationality of vessels transiting Canal.....	12
Cargo carried by vessels of leading maritime nations.....	13
Vessels paying tolls on displacement tonnage.....	13
Vessels entitled to free transit.....	14
Small commercial vessels transiting Canal.....	14
Cargo shipments segregated by principal trade routes.....	14
Origin and destination of cargo.....	15
Principal commodities.....	20
Classification of vessels between laden and ballast traffic.....	21
Laden and ballast traffic by nationality.....	24
Average tonnage, tolls, and tons of cargo per cargo-carrying vessel.....	24
Steam, motor, and other vessels.....	25
Frequency of transits of vessels through the Panama Canal.....	25
Gross tonnage of vessels.....	27
Summary of passenger movement at Canal during 1939.....	29
Transient passengers.....	29
Revised measurement rules for transiting vessels.....	30
Canal operation and maintenance.....	30
Hours of operation.....	30
Operating schedules of locks.....	31
Lockages and lock maintenance.....	31
Atlantic locks overhaul.....	32
Power for Canal operation.....	33
Water supply.....	34
Dry season, 1939.....	35
Floods.....	35
Madden Lake.....	36
Madden Dam.....	36

Canal operation and maintenance—Continued.	Page
Maintenance of channel	36
Ordinary channel maintenance	38
Special maintenance projects	38
Slides	39
Subsidiary dredging division activities	40
Equipment	41
Ferry service	42
Marine activities	42
Aids to navigation	42
Accidents to shipping	43
Salvage and towing	43
Meteorology—hydrology—seismology	44

SECTION II.—BUSINESS OPERATIONS

Panama Canal business operations	47
Mechanical and marine work	48
Drydocks	48
Marine repair work	49
Work other than marine work	49
Plant improvements	50
Electrical installation and repair work	50
Purchases and inspections in the United States	51
Storehouses and ship chandlery	51
Obsolete and unserviceable property and equipment	52
Fuel oil, Diesel oil, gasoline, and kerosene	52
Building construction and maintenance	53
Quarters for employees	53
Replacement of quarters for American employees	54
Motor transportation	57
Panama Canal Press	57
Revenues derived from the rental of lands in the Canal Zone	57
Business operations under the Panama Railroad Co.	58
Trans-Isthmian Railroad	59
Receiving and Forwarding Agency	59
Coaling plants	59
Telephones and telegraphs	60
Real estate operations	60
Commissary Division	60
Hotels	61
Mindi Dairy	62
Panama Railroad Steamship Line	62

SECTION III.—ADMINISTRATION

Departments	63
Operation and maintenance	63
Supply	63
Accounting	63
Executive	63
Health	64
Panama Railroad Co.	64
Changes in administrative personnel	64
Changes in administrative organization	65
Employees	65

	Page
Personnel administration.....	66
Gold employees.....	67
Recruiting and turn-over of force.....	68
Wage adjustments.....	69
Silver employees.....	70
Silver wages.....	71
Silver eligibility and employment program.....	71
Repatriations.....	72
Cash relief for disabled employees.....	73
Experiment gardens.....	74
Clubhouses and playgrounds.....	75
Clubhouse subdivision.....	76
Subdivision of playgrounds.....	76
Legislation.....	77
Capital allotments, fiscal year 1940.....	79
General program.....	81
Additional needs.....	82
Engineering and architectural design.....	82
Staff Agency—Plans Section.....	82
Providing for the defense of the Canal and increasing its capacity for future needs of interoceanic shipping.....	83
Visit of President Roosevelt.....	84

SECTION IV.—GOVERNMENT

Area of the Canal Zone.....	85
Population.....	86
Public Health.....	86
Vital statistics.....	87
Malaria.....	88
Hospitals and dispensaries.....	89
Quarantine and immigration.....	89
Municipal engineering.....	90
Testing laboratory.....	90
Water system.....	91
Sewer system.....	92
Roads, streets, and sidewalks.....	92
Gamboa project.....	92
Cardenas River bridge.....	92
Construction of concrete runways at Albroom Field.....	93
Cities of Colon and Panama.....	93
Miscellaneous projects.....	93
Public order.....	94
Fire protection.....	96
Magistrates' courts.....	96
Balboa.....	96
Cristobal.....	96
Pardons and reprieves.....	97
Public school system.....	97
Postal system.....	99
Air mail.....	100
Immigration visas.....	101
Relations with Panama.....	101
Customs.....	102
Shipping commissioner.....	102

	Page
Administration of estates.....	103
Licenses and taxes.....	103
Foreign corporations.....	104
Insurance.....	104
Commercial aviation.....	104

SECTION V.—FINANCIAL AND STATISTICAL STATEMENTS

Accounting system.....	107
Operations of the Panama Railroad Co.....	108
Panama Canal operations.....	108
Index to tables.....	109
Financial tables.....	110

REPORTS OF HEADS OF DEPARTMENTS AND DIVISIONS

APPENDIXES NOT PRINTED

The material in the annual report of the Governor of The Panama Canal, published in this volume, is to a large extent a summary of the data presented in the annual reports from the heads of departments and divisions in the Canal organization; the latter, regarded as appendixes to the report of the Governor, are not printed. The annual reports of the Panama Railroad Co. and the health department are published separately; the latter is compiled for calendar years only. The reports of the heads of departments and divisions, as listed below, are on file at the Washington office of the Panama Canal or at the office of the Governor at Balboa Heights, Canal Zone:

Engineer of maintenance, report of.

Special engineering section, report of designing engineer.

Dredging division, report of superintendent.

Plans section, report of chief.

Assistant engineer of maintenance, report of.

Electrical division, report of electrical engineer.

Municipal engineering division, report of municipal engineer.

Locks division, report of superintendent.

Office engineer (acting), report of.

Section of surveys, report of acting chief.

Marine division, report of marine superintendent.

Mechanical division, report of superintendent.

Supply department, report of acting chief quartermaster.

Accounting department, report of comptroller.

Executive department:

Division of civil affairs, report of chief.

Police and fire division, report of chief.

Division of schools, report of superintendent.

Bureau of clubs and playgrounds, report of acting general secretary.

Division of personnel supervision and management, report of director of personnel.

Surveying officer (acting), report of.

Public defender.

Paymaster.

Magistrates' courts:

Magistrate, Cristobal, report of.

Magistrate, Balboa, report of.

Real estate section, report of acting chief.

Washington office, report of chief of office and general purchasing officer.

Pardon board, report of chairman.

Senior aeronautical inspector, report of.

General counsel, report of.

ANNUAL REPORT
OF THE
GOVERNOR OF THE PANAMA CANAL

BALBOA HEIGHTS, CANAL ZONE,
October 10, 1939.

THE SECRETARY OF WAR,
Washington, D. C.

SIR: I have the honor to submit the report of the Governor of the Panama Canal for the fiscal year ended June 30, 1939.

Respectfully,

C. S. RIDLEY, *Governor.*

INTRODUCTION

The administration of the affairs of the Panama Canal enterprises involves three main elements—(a) the operation and maintenance of the Canal itself; (b) the operation of the auxiliary enterprises necessary to provide adequately for the needs of shipping and of the Canal operating forces; and (c) the government of the Canal Zone, populated by American civilians, native or tropical workers and their families, and by the United States Army and Navy defense forces.

The immediate supervision of the administration of these various activities rests with the heads of the nine major departments and divisions reporting to the Governor, in whom is centered responsibility and control of the entire organization either in his capacity as Governor of the Panama Canal or as president of the Panama Railroad Co., an adjunct of the Canal enterprise, organized as a Government-owned corporation.

OPERATION AND MAINTENANCE OF THE CANAL

The primary function of the Panama Canal is to provide and maintain a waterway by means of which vessels may make the transit from one ocean to the other, and to handle such traffic as presents itself for transit with a maximum of safety and a minimum of delay. Essentially this involves the maintenance of the waterway, the operation

of the locks, and the control of traffic through the Canal. Throughout the year the Canal force maintained its high standard of expeditious service not only in the actual transiting of ships but in providing emergency repairs, fuel, supplies, and the various supplementary services incidental to shipping. There were no interruptions to traffic during the year.

OPERATION OF AUXILIARY ENTERPRISES—BUSINESS OPERATIONS

Secondary only to the operation of the Canal is the function of supplying various services to shipping. Commerce requires at the Canal certain adjuncts essential to shipping, such as fuel oil and coal-ing plants, storehouses for foodstuffs, ship chandlery, and other essential supplies, marine and railway repair shops, terminal facilities for the transshipment of cargo and passengers, a railroad line across the Isthmus and a steamship line between New York and Panama, quarters and commissaries for the operating force, and other adjuncts essential to the economical and efficient operation of the Canal. These services, under coordinated and centralized control, are provided by the various business units of the Panama Canal and Panama Railroad Co. The coordination of such services with the transit of ships through the Canal assists materially in the efficient and economical operation of the waterway. Moreover, in providing marine repair facilities, fuel, and other supplies, the operation of these business units promotes traffic through the Canal.

GOVERNMENT—ADMINISTRATION

The usual functions of government, such as schools, police and fire protection, quarantine, public health, immigration service, posts, customs, aids to navigation, steamboat inspection, hydrographic and meteorological work, water supply, sewers, construction and maintenance of streets, and similar activities, which, in the United States, are directed by various officers of the national, State, and municipal governments, are entrusted in the Canal Zone to the Governor, and are executed under his authority and responsibility. This centralization of all governmental activities under one head is essential to economical and efficient administration.

SERVICES RENDERED BY THE CANAL TO SHIPPING

The more important items of the business of the Canal and its adjuncts covering principal services to shipping are expressed numerically in the following table, which presents a comparison of the activities during the fiscal year 1939 with the 2 years immediately preceding:

	Fiscal year 1939	Fiscal year 1938	Fiscal year 1937
Transits of Canal by ocean-going vessels paying tolls	5,903	5,524	5,387
Transits of small commercial traffic not counted in ocean-going traffic	914	931	807
Free transits of U. S. Army and Navy vessels, Colombian Government vessels, vessels for repairs, etc.	664	476	501
Total transits	7,481	6,931	6,695
Number of lockages during year:			
Gatun Locks	6,054	5,651	5,504
Pedro Miguel Locks	6,283	5,870	5,735
Miraflores Locks	6,221	5,813	5,608
Tolls levied on ocean vessels	\$23,661,021.08	\$23,169,888.70	\$23,102,137.12
Tolls on small commercial vessels	38,408.94	45,318.69	45,503.34
Total tolls	23,699,430.02	23,215,207.39	23,147,640.46
Cargo passing through Canal (tons)	27,866,627	27,385,924	28,108,375
Net tonnage (Panama Canal measurement) of transiting ocean vessels	27,170,007	25,950,383	25,430,000
Cargo per Panama Canal net ton of ocean vessels, laden vessels only	1,238	1,225	1,296
Average tolls per ton of cargo, laden vessels only	\$0.727	\$0.750	\$0.722
Calls at Canal ports by ships not transiting Canal	831	865	863
Cargo handled and transferred at ports (tons)	1,580,859	1,530,287	1,446,818
Coal, sales and issues (tons)	70,487	103,844	71,861
Coal, number of commercial ships bunkered	276	312	296
Fuel oil pumped (barrels)	9,037,955	7,187,667	9,033,060
Fuel oil—number of ships served other than vessels operated by the Panama Canal	2,063	1,903	1,929
Ships repaired, other than Panama Canal equipment	587	633	601
Ships drydocked, other than Panama Canal equipment	119	106	120
Provisions sold to commercial ships (commissary sales)	\$307,342.16	\$327,943.72	\$354,341.59
Chandlery sold to ships (storehouse sales)	\$45,785.68	\$61,213.12	\$49,904.02

NET REVENUES

The net revenues from Canal operations proper were \$13,841,071.19 as compared with \$13,909,903.26 last year. Net revenues from business operations under The Panama Canal for 1939 were \$681,272.48, as compared with \$824,612.60 in 1938. The combined net revenues accruing from the Canal and its business units totaled \$14,522,343.67, as compared with \$14,734,515.86 in 1938.

The gross capital investment as of the beginning of the fiscal year was \$540,694,147.73 and the net investment, \$508,346,822.50. Net revenue for the year 1939 produced a return of 2.86 percent on this net investment as against 2.90 for the previous year.

The foregoing figures do not include the Isthmian operations carried on by the Panama Railroad Co., which yielded a net profit of \$1,481,847.10 for the year, as compared with \$1,183,453.40 for the previous fiscal year, an increase of \$298,393.70 or 25.2 percent.

REPLACEMENTS

The past fiscal year marked the close of 25 years of successful operation of the Panama Canal; in fact, its dependable and efficient service is now taken for granted.

One of the factors which has made this possible is the high state of maintenance in which all wearing and deteriorating parts are kept. Of the total capital value of the Panama Canal there are approximately

\$100,000,000 of general structural values pertaining to nonbusiness units of the organization, which are subject to deterioration and require regular repair and periodical replacement.

Some of these structures, such as dams, and concrete buildings, are still in excellent condition and require but little expenditure for upkeep; but on others deterioration has reached a point where replacement should not longer be deferred. These necessary replacements include not only the frame buildings originally erected to serve during the period of the construction of the Canal, but also docks, highways, etc., which, due to ordinary deterioration or other conditions, have been rendered inadequate or unserviceable for present requirements or uneconomical to maintain.

Funds for the replacement of worn-out plant and equipment for these nonbusiness units (with the exception of floating plant) must be appropriated for by Congress from the general funds of the Treasury, since no funded replacement reserves for these operations are maintained by the Panama Canal. However, in the Canal accounts depreciation charges are made on depreciable property, but the funds covering depreciation charges for nonbusiness units are turned in to the general fund of the Treasury each year and are not available without appropriation. Thus, for this part of the organization, the Panama Canal depends on Congress to provide from these funds (which have been deposited annually in the Treasury in prior years) the necessary replacement of worn-out and obsolete plant to maintain the enterprise up to the standard of operation.

Not only is there demand for replacement of some of the existing facilities but also the need develops for new kinds of facilities. Funds for such new facilities must also be obtained by direct appropriation.

For these reasons, it is essential to the continued efficiency of the Canal and to the growth of its facilities to meet the growing demands, that the Bureau of the Budget and the Congress give careful consideration to the requirements submitted annually by the Governor for these purposes.

•

SECTION I

CANAL OPERATION AND TRADE VIA THE PANAMA CANAL

STATISTICS OF CANAL TRAFFIC

The number of ocean-going commercial vessels ¹ making passage of the Panama Canal in 1939, was the highest since 1930, and the fourth greatest in the history of the waterway. The 5,903 transits in 1939, representing a daily average of 16.17, showed an increase of 379, or 6.86 percent, over the previous year.

Tolls on the 5,903 transits totaled \$23,661,021.08, in comparison with \$23,169,888.70 in 1938, an increase of \$491,132.38, or 2.12 percent.

Cargo carried amounted to 27,866,627 long tons in 1939, in comparison with 27,385,924 tons in 1938, an increase of 480,703 tons, or 1.76 percent.

Panama Canal net tonnage of the 5,903 ocean-going commercial vessels transiting the Canal during 1939 aggregated 27,170,007 tons as against 25,950,383 in 1938, an increase of 1,219,624 tons or 4.70 percent. The fiscal year 1939 was the first full year that the revised measurement rules (which became effective March 1, 1938) were in force. Such tonnage under the revised rules is about 7.5 percent less than under the rules in effect prior to March 1, 1938; hence, in making the comparison of Panama Canal net tonnage between 1939 and 1938 it was necessary to reduce by 7.5 percent the tonnage for eight months of 1938, i. e., between July 1, 1937, and February 28, 1938.

A brief review of traffic from the opening of the Canal on August 15, 1914, indicates that starting with a total of 1,058 transits in the fiscal year 1915 there was a gradual growth of traffic which reached a total of 6,289 transits in the fiscal year 1929. The fiscal year 1929 may be considered the record year in Canal traffic with a total of 6,289 transits (an average of 17.2 transits per day), total tolls of \$27,111,125, and total cargo carried through the Canal of 30,647,768 tons, although the Panama Canal net tonnage of 27,585,000 (estimated in accordance with the present rules) of the ships in the fiscal year 1929 was slightly exceeded the following year (fiscal year 1930) when the Panama Canal net tonnage was 27,716,000 (estimated in accordance with present rules). From these record levels the world-wide depression reduced Canal traffic during the next four years so that the number of transits was only 4,162 in the fiscal year ended June 30, 1933. Traffic

¹ Includes all tolls-paying vessels having a measurement of 300 or more net tons (Panama Canal measurement) or 500 or more displacement tons.

has gradually increased since 1933 but is still well below the high peaks reached in 1929 and 1930.

The following table shows a comparison between traffic in the fiscal years 1939 and 1929, indicating the relationship of these 2 years and the percentage of 1939 traffic to the peak traffic in 1929:

	Number of transits	Panama Canal net tonnage	Tolls	Tons of cargo
Fiscal year 1929	6,289	27,585,000	\$27,111,125	30,647,768
Fiscal year 1939	5,003	27,170,007	\$23,661,021	27,866,627
Percentage of traffic (1939+1929)	93.9	98.5	87.3	90.9

Although, in general, Panama Canal traffic has followed the trends outlined in the preceding paragraphs, it has been subject to considerable fluctuation due to increases and decreases in the number of tankers transiting the Canal, largely carrying cargo from the oil fields in California. These surges in the tanker traffic have not followed variations in the balance of Canal traffic but have varied from a peak of 1,704 transits in 1924, when tankers comprised 33.1 percent of the total Canal transits, to a total of only 562 transits in 1938, when tanker transits comprised but 10.2 percent of the total. Mineral oil shipments caused a very sharp increase in traffic in 1923 and 1924, and the following slight decline, as well as a part of the increase in 1934 and the small decline in the following year. For this reason the trends of traffic through the Panama Canal are more easily understood when a distinction is made between tankers and all other types of ships. The tables on pages 11 and 12 of this report segregate traffic between these two classes of ships.

The total cargo moving through the Canal in 1939 was slightly greater than in 1938 due to increased tonnage from the Pacific to the Atlantic, since that passing through from the Atlantic to the Pacific showed a decrease from 9,688,560 tons in 1938 to 9,011,267 tons in 1939, a loss of about 7.0 percent. The east-bound movement of cargo, which normally runs from two to three times greater than that in the opposite direction, increased from 17,697,364 in 1938 to 18,855,360 in 1939, a gain of 1,157,996 tons, or 6.5 percent.

What may be considered the most important development in the movement of cargo during the year occurred in two of the principal trade routes, i. e., (a) the sharp decline in the volume exchanged between the United States and the Orient and (b) the marked gain in that moving from the Pacific to the Atlantic in the trade between Europe and the west coast of Canada. In the trade between the United States and the Orient, the combined movement of cargo decreased from 3,526,536 tons in 1938 to 2,874,401 in 1939, a loss of 652,135 tons, or 18.5 percent. In the movement from the Atlantic to the Pacific in this trade which, in the past 3 years, has totaled more than the west-bound movement of any other trade served by

the Canal, the decrease in tonnage equalled almost a half million tons (about 16 percent) less than in the previous year. Making up the major portion of this loss were lessened shipments of manufactures of iron and steel, pig iron, and phosphates. Cargo moving from the Pacific to the Atlantic in the trade between the United States and the Orient forms but a small percentage of the total moving in both directions (about 13 percent in the past 3 years). However, the decrease in the east-bound movement was relatively larger than that in the opposite direction, declining from 433,544 tons in 1938 to 280,593 tons in 1939, a loss of approximately 153,000 tons (35 percent). This loss involved numerous types of Oriental goods. In the movement of cargo from Canada to Europe, which increased approximately 825,000 tons (48 percent), the principal commodities involved were wheat, with a gain of 700,000 tons, and lumber with a gain of 85,000 tons. In the Atlantic to Pacific movement in this trade there was a decrease from 98,702 tons in 1938 to 78,789 tons in 1939, a loss of about 20,000 tons (20 percent). Small shipments of miscellaneous manufactured goods largely accounted for this loss.

In the United States intercoastal trade, which, for many years, has been the most important route served by the Canal, 6,884,726 tons of cargo (almost 25 percent of the total) passed through the Canal in 1939. This was an increase of 490,151 tons, or 7.7 percent, over the preceding year. Although gains were made in both directions in this trade, the east-bound movement was more pronounced, a gain of 440,475 tons, or 11 percent, being recorded in the cargo tonnage in this direction. Among the more important commodities participating in this increase were lumber, with a gain of 187,000 tons; mineral oils, 150,000 tons; and canned food products, 140,000 tons. The west-bound movement in the United States intercoastal trade aggregated 2,391,523 tons, an increase of about 50,000 tons, or 2 percent, over the amount moving west-bound in the previous year.

In other principal trades there was an increase in the total cargo moving between Europe and the west coast of the United States and between Europe and Australasia. In the former, which increased 265,328 tons (11.0 percent) over the 2,421,961 tons moving in this trade in 1938, the gain was due entirely to the heavy movement from the Pacific to the Atlantic, since that moving in the opposite direction fell short of over 100,000 tons of equalling the west-bound shipments of 1938. The principal items of cargo making up the increase in the Pacific to Atlantic movement in this trade were wheat, fresh fruit, canned food products, and mineral oils. The decrease in the west-bound movement was due chiefly to fewer shipments of coke and sand. In the trade between Europe and Australasia an increase of about 50,000 tons (4 percent) in cargo was recorded between these two geographical areas. As was the case in a number of other prin-

cipal trades served by the Canal in 1939 this increase was in the Pacific to Atlantic movement. Larger shipments of food products in cold storage, ores, and phosphates were the principal items of cargo contributing to this increase. The tonnage moving from the Atlantic to Pacific in 1939 approximately equalled that moving in this direction in 1938.

Decreases were recorded in the trade between Europe and South America, United States and the Philippine Islands, United States and Australasia, and the United States and Hawaiian Islands. In the trade between Europe and South America, the loss in the combined movement in both directions amounted to about 77,000 tons, or 2.6 percent. In the tonnage moving west-bound the decrease was 38,000 tons (8.3 percent), and that in the opposite direction fell off 39,000 tons (1.5 percent). Although the west-bound movement of cargo passing between the United States and the Philippine Islands showed a gain of some 60,000 tons over the preceding year, the tonnage in the opposite direction decreased almost 200,000 tons, which was due chiefly to reduced shipments of sugar. The largest percentage of decrease in the combined movement in both directions occurred in the trade between the east coast United States and Australasia. The total tonnage in 1939 aggregated 461,543 tons, which was 166,804 tons, or 26.5 percent, less than the combined movement in both directions in 1938. The movement in both directions contributed to this decline—that from the Atlantic to Pacific dropping from 471,299 tons in 1938 to 374,544 in 1939, a decrease of 20.5 percent, while that from the Pacific to the Atlantic decreased from 157,048 tons in 1938 to 86,999 tons in 1939, a loss of 44.6 percent. Much of the decline in the east-bound movement was attributed to the greatly reduced shipments of chrome ore, while in the opposite direction there were sharp decreases in a number of manufactured products, including automobiles, agricultural implements, and iron and steel goods. In the trade between the east coast of the United States and the Hawaiian Islands, which decreased from 601,839 tons in 1938 to 503,661 tons in 1939, a loss of 98,178 tons, or 16.3 percent, the major portion of the decline was in the east-bound movement and was due to reduced shipments of sugar and molasses. There was also a slight loss in the movement in the opposite direction in this trade.

Cargo moving between the east coast of the United States and the west coast of South America, combining movements in both directions, was substantially the same as in the preceding year. However, there was a loss of some 70,000 tons, or about 26 percent, of cargo moving to the South American countries on the west coast, while the movement in the opposite direction increased (chiefly through larger iron-ore shipments) almost a like number of tons.

Further details of the individual commodities and of the trade routes served by the Canal are presented on pages 14 to 21 of this report.

In the fiscal year 1939, transits of local commercial vessels under 300 tons, Panama Canal measurement, numbered 914, on which tolls of \$38,408.94 were paid. Transits of naval and other public vessels of the United States, war vessels of the Colombian Government, and vessels transiting solely for repairs, none of which paid tolls, numbered 664, as against 476 for 1938. The total of all toll-paying and free transits combined numbered 7,481, in comparison with 6,931 in 1938, equivalent to averages of 20.50 and 18.99 transits per day, respectively.

The receipts from tolls as reported to the United States Treasury for the fiscal year 1939 were \$23,699,413.82. This figure includes tolls on local commercial traffic amounting to \$38,408.94, which are not included in the Canal statistics covering ocean-going commercial traffic. The toll receipts reported to the United States Treasury moreover reflect minor adjustments for overcharges and under collections amounting to \$16.20. These two items account for the difference of \$38,392.74 between the tolls receipts reported to the Treasury and the figure for tolls levied on ocean-going commercial traffic as reported in the following studies of traffic which are based on tolls levied at the time of transit.

CANAL TRAFFIC BY FISCAL YEARS 1915 TO 1939

Comparative traffic statistics covering ocean-going vessels for each fiscal year since the Canal was opened to navigation are shown in the table following:

Fiscal year ended June 30—	Number of transits	Panama Canal net tonnage ¹	Tolls	Tons of cargo
1915 ¹	1,058	3,507,000	\$4,366,747.13	4,888,400
1916 ²	724	2,212,000	2,403,089.40	3,093,335
1917.....	1,738	5,357,000	5,620,799.83	7,054,720
1918.....	1,989	6,072,000	6,428,780.26	7,525,708
1919.....	1,948	5,658,000	6,164,290.79	6,910,097
1920.....	2,393	7,898,000	8,507,938.68	9,372,374
1921.....	2,791	10,550,000	11,268,681.46	11,595,971
1922.....	2,665	10,556,000	11,191,828.56	10,882,607
1923.....	3,908	17,206,000	17,504,027.19	19,566,429
1924.....	5,158	24,181,000	24,284,659.92	26,993,167
1925.....	4,592	21,134,000	21,393,718.01	23,956,549
1926.....	5,087	22,906,000	22,919,931.89	26,030,016
1927.....	5,293	24,245,000	24,212,250.61	27,733,555
1928.....	6,253	27,229,000	26,922,200.75	29,615,651
1929.....	6,289	27,585,000	27,111,125.47	30,647,768
1930.....	6,027	27,716,000	27,059,998.94	30,018,429
1931.....	5,370	25,690,000	24,624,599.76	25,065,283
1932.....	4,362	21,842,000	20,694,704.61	19,798,986
1933.....	4,162	21,094,000	19,601,077.17	18,161,165
1934.....	5,234	26,410,000	24,047,183.44	24,704,009
1935.....	5,180	25,720,000	23,307,062.93	25,309,527
1936.....	5,382	25,923,000	23,479,114.21	26,505,943
1937.....	5,387	25,430,000	23,102,137.12	28,108,375
1938.....	5,524	25,950,383	23,160,888.70	27,385,924
1939.....	5,903	27,170,007	23,661,021.08	27,866,627
Total.....	104,417	469,241,390	453,046,857.91	498,790,675

¹ Canal opened to traffic Aug. 15, 1914.

² Canal closed to traffic approximately 7 months of fiscal year by slides.

³ Panama Canal net tonnage prior to 1939 are estimated figures based on revised measurement rules which became effective Mar. 1, 1938.

TRAFFIC BY MONTHS--FISCAL YEARS 1939 AND 1938

The ocean-going commercial traffic during each month of the fiscal year 1939 is summarized in the following table, in which are inserted for comparison corresponding figures for the preceding year:

Month	Number of transits		Panama Canal net tonnage		Tons of cargo		Tolls	
	1938-39	1937-38	1938-39	1937-38	1938-39	1937-38	1938-39	1937-38
July	429	457	1,933,816	2,216,000	2,025,660	2,476,366	\$1,694,205.00	\$2,029,642.45
August	468	505	2,177,699	2,402,000	2,171,674	2,780,603	1,890,050.74	2,195,308.87
September	438	444	2,005,241	2,139,000	1,968,464	2,385,142	1,741,895.46	1,935,673.78
October	494	461	2,276,194	2,182,000	2,359,673	2,438,788	1,977,706.76	1,981,087.87
November	505	435	2,302,333	2,110,000	2,223,830	2,185,283	1,984,014.72	1,893,462.00
December	509	439	2,336,011	2,070,000	2,374,395	2,046,170	2,031,017.04	1,845,048.20
January	525	441	2,380,916	2,053,000	2,393,360	2,095,402	2,062,454.16	1,837,894.72
February	501	436	2,282,318	1,993,000	2,206,963	1,998,827	1,906,735.66	1,786,611.45
March	553	506	2,586,580	2,311,526	2,694,068	2,268,548	2,252,156.28	2,015,585.34
April	496	487	2,278,326	2,258,836	2,472,504	2,279,235	1,999,851.16	1,961,456.58
May	506	465	2,341,891	2,150,228	2,538,949	2,309,171	2,053,502.16	1,886,825.66
June	479	445	2,268,679	2,064,793	2,437,087	2,122,380	1,977,431.94	1,801,291.78
Total	5,903	5,524	27,170,007	25,950,383	27,866,627	27,385,924	23,661,021.08	23,169,888.70
Average per month	492	460	2,264,167	2,162,532	2,322,219	2,282,160	1,971,751.76	1,930,824.06

¹ Panama Canal tonnage as figured under the rules which became effective Mar. 1, 1938.

² Estimated tonnage under rules which became effective Mar. 1, 1938.

TANKER TRAFFIC

Transits of tank ships during the fiscal year 1939 totaled 580, an increase of 18, or 3.2 percent, in comparison with the 1938 total of 562. Transits of this type of vessel in 1939 comprised 9.8 percent of the total ocean-going commercial transits, made up 12.4 percent of the total net tonnage, Panama Canal measurement, paid 11.7 percent of the total tolls collected, and carried 13.0 percent of the cargo which passed through the Canal.

Cargo carried through the Canal in tank ships during the fiscal year 1939 amounted to 3,631,355 tons, in comparison with 3,584,615 tons in 1938, an increase of 46,740 tons, or 1.3 percent. Segregation of the 1939 traffic by direction of transit shows that 684,014 tons of tanker cargo went through from the Atlantic to the Pacific, and 2,947,341 tons from the Pacific to the Atlantic.

Of the mineral oil cargoes carried through the Canal during the fiscal year 1939, approximately 36 percent were gasoline, benzine, and naphtha; 27 percent crude oil; 27 percent Diesel and fuel oils; and the remainder, 10 percent, lubricating oils and kerosene.

The three tables below, which begin with the fiscal year 1923 and thus cover the period during which tankers have been an important component of the traffic through the Canal, show the traffic divided between tank ships and all other ocean-going commercial vessels, classified herein as "all other." The tables show the number and daily averages of the two classes, and of the total; the quantities and proportion of net tonnages, and the amounts and proportion of tolls:

Number and daily average transits of tankers and all other carriers

Fiscal year	Ocean-going commercial transits			Daily average		
	Tankers	All other	Total	Tankers	All other	Total
1923.....	913	2,995	3,908	2.5	8.2	10.7
1924.....	1,704	3,454	5,158	4.7	9.4	14.1
1925.....	1,079	3,513	4,592	3.0	9.6	12.6
1926.....	1,090	3,997	5,087	3.0	11.0	14.0
1927.....	1,324	3,969	5,293	3.6	10.9	14.5
1928.....	1,121	5,132	6,253	3.0	14.0	17.0
1929.....	1,083	5,206	6,289	3.0	14.2	17.2
1930.....	1,218	4,809	6,027	3.3	13.2	16.5
1931.....	944	4,426	5,370	2.6	12.1	14.7
1932.....	612	3,750	4,362	1.7	10.2	11.9
1933.....	636	3,526	4,162	1.7	9.7	11.4
1934.....	942	4,292	5,234	2.6	11.7	14.3
1935.....	791	4,380	5,180	2.2	12.0	14.2
1936.....	598	4,784	5,382	1.6	13.1	14.7
1937.....	643	4,744	5,387	1.8	13.0	14.8
1938.....	562	4,962	5,524	1.5	13.6	15.1
1939:						
July.....	44	385	429	1.4	12.4	13.8
August.....	57	411	468	1.8	13.3	15.1
September.....	49	389	438	1.6	13.0	14.6
October.....	44	450	494	1.4	14.5	15.9
November.....	45	460	505	1.5	15.3	16.8
December.....	48	461	509	1.5	14.9	16.4
January.....	48	477	525	1.5	15.4	16.9
February.....	42	459	501	1.5	16.4	17.9
March.....	45	508	553	1.5	16.3	17.8
April.....	44	452	496	1.5	15.0	16.5
May.....	50	456	506	1.6	14.7	16.3
June.....	64	415	479	2.1	13.9	16.0
Total.....	580	5,323	5,903	1.6	14.6	16.2

Proportion of tanker and all other net tonnage

Fiscal year	Panama Canal net tonnage			Percentage of total net tonnage		
	Tankers	All other	Total	Tankers	All other	Total
1923.....	5,326,000	11,880,000	17,206,000	31.0	69.0	100.0
1924.....	10,120,000	14,061,000	24,181,000	41.9	58.1	100.0
1925.....	6,367,000	14,767,000	21,134,000	30.1	69.9	100.0
1926.....	6,286,000	16,620,000	22,906,000	27.4	72.6	100.0
1927.....	7,555,000	16,690,000	24,245,000	31.2	68.8	100.0
1928.....	6,188,000	21,041,000	27,229,000	22.7	77.3	100.0
1929.....	5,792,000	21,793,000	27,585,000	21.0	79.0	100.0
1930.....	6,505,000	21,211,000	27,716,000	23.5	76.5	100.0
1931.....	5,237,000	20,453,000	25,690,000	20.4	79.6	100.0
1932.....	3,538,000	18,304,000	21,842,000	16.2	83.8	100.0
1933.....	3,775,000	17,319,000	21,094,000	17.9	82.1	100.0
1934.....	5,760,000	20,650,000	26,410,000	21.8	78.2	100.0
1935.....	4,635,000	21,085,000	25,720,000	18.0	82.0	100.0
1936.....	3,155,000	22,467,000	25,622,000	13.3	86.7	100.0
1937.....	3,714,000	21,716,000	25,430,000	14.6	85.4	100.0
1938.....	3,190,033	22,760,350	25,950,383	12.3	87.7	100.0
1939.....	3,361,367	23,808,640	27,170,007	12.4	87.6	100.0

Proportion of tolls from tank ships and from all other vessels

Fiscal year	Tolls paid by shipping using Canal			Percentage of total tolls		
	Tankers	All other	Total	Tankers	All other	Total
1923	\$4,700,324.63	\$12,734,702.50	\$17,504,027.19	27.2	72.8	100.0
1924	9,071,835.65	15,212,824.27	24,284,659.92	37.4	62.6	100.0
1925	5,728,302.26	15,665,415.75	21,393,718.01	26.8	73.2	100.0
1926	5,626,167.93	17,293,763.96	22,919,931.89	24.5	75.5	100.0
1927	6,658,806.90	17,553,443.71	24,212,250.61	27.5	72.5	100.0
1928	5,430,437.16	21,485,763.59	26,922,200.75	20.2	79.8	100.0
1929	5,145,632.19	21,965,493.28	27,111,125.47	19.0	81.0	100.0
1930	5,768,953.28	21,291,035.66	27,059,998.94	21.3	78.7	100.0
1931	4,682,320.14	19,942,279.62	24,624,599.76	19.0	81.0	100.0
1932	3,197,135.29	17,497,568.32	20,694,704.61	15.4	84.6	100.0
1933	3,393,311.02	16,207,766.15	19,601,077.17	17.3	82.7	100.0
1934	5,161,787.40	18,885,396.04	24,047,183.44	21.5	78.5	100.0
1935	4,192,863.09	19,114,199.84	23,307,062.93	18.0	82.0	100.0
1936	3,192,498.46	20,286,615.75	23,479,114.21	13.6	86.4	100.0
1937	3,451,771.65	19,650,365.47	23,102,137.12	14.9	85.1	100.0
1938	2,846,711.79	20,323,176.91	23,169,888.70	12.3	87.7	100.0
1939	2,766,239.86	20,891,731.22	23,661,021.08	11.7	88.3	100.0

NATIONALITY OF VESSELS TRANSITING CANAL

Segregation of the ocean-going traffic through the Canal during the fiscal year 1939, by nationality, is presented in the following table which shows transits, measurement tonnage, tolls, and tons of cargo:

Ocean-going commercial traffic¹ through the Panama Canal during the fiscal year 1939, by nationality of vessels

Nationality	Number of ships	Measured tonnage			Tolls	Tons of cargo
		Panama Canal net	Registered gross	Registered net		
Belgian	1	5,900	8,718	4,752	\$5,310.00	12,483
British	1,502	7,670,148	9,462,345	5,734,048	6,610,453.26	6,801,556
Chilean	26	108,240	156,125	92,626	94,518.90	62,904
Danish	200	758,021	865,500	524,441	664,454.16	727,552
French	107	531,238	710,044	388,708	473,438.38	501,752
German	361	1,454,702	1,830,050	1,066,578	1,299,223.44	1,468,996
Greek	117	553,999	627,338	381,590	469,487.70	666,471
Honduran	37	59,766	100,475	59,101	51,474.60	27,208
Italian	59	324,926	463,312	275,069	298,816.32	179,468
Japanese	261	1,518,254	2,021,556	1,250,844	1,354,716.54	1,710,303
Latvian	1	2,738	3,204	1,875	2,464.20	4,870
Netherland	312	804,627	943,574	559,476	701,670.06	675,105
Norwegian	704	3,199,352	3,770,432	2,248,510	2,709,337.68	3,408,078
Panamanian	193	359,013	493,803	294,347	299,174.40	371,721
Peruvian	6	12,088	17,786	10,590	10,879.20	8,339
Philippine	5	21,025	26,060	15,420	21,622.50	37,057
Soviet	8	17,654	26,320	15,338	17,488.60	19,026
Swedish	157	719,861	1,254,967	654,787	613,432.98	1,008,245
United States	1,788	8,799,510	11,494,098	6,977,214	7,758,390.78	9,909,380
Venezuelan	2	3,468	5,630	3,144	2,809.08	2,300
Yugoslavian	56	244,377	301,748	186,828	201,858.30	266,913
Total, fiscal years:						
1939	5,903	27,170,007	34,583,085	20,745,286	23,661,021.08	27,866,627
1938	5,524	25,950,383	32,918,177	19,621,870	23,169,888.70	27,385,924
1937	5,387	25,430,000	32,575,300	19,303,366	23,102,137.12	28,108,375

¹ Ocean-going commercial traffic includes only tolls-paying vessels of 300 net tons and over, Panama Canal measurement, and vessels paying tolls on displacement tons of 500 displacement tons and over.

² Estimated tonnage under rules which became effective Mar. 1, 1938.

CARGO CARRIED BY VESSELS OF LEADING MARITIME NATIONS

Segregating the traffic through the Canal by nationality of vessels, the following table shows the aggregate cargo carried by ships of the leading maritime nations during each of the past 5 years. For the year 1939 the percentage of total cargo carried by ships of each nationality is also shown:

Nationality	1939		Tons of cargo			
	Tons	Percent- age	1938	1937	1936	1935
United States.....	9,909,380	35.6	9,892,619	9,844,254	10,700,535	10,825,573
British.....	6,801,556	24.4	6,417,016	7,179,136	6,181,571	5,776,021
Norwegian.....	3,408,078	12.2	3,433,571	3,506,109	2,717,860	2,463,675
Japanese.....	1,710,303	6.1	1,877,502	1,789,178	1,697,880	1,446,049
German.....	1,468,996	5.3	1,518,593	1,496,084	1,305,090	1,300,991
Swedish.....	1,008,245	3.6	763,049	775,800	855,409	782,548
Danish.....	727,552	2.6	865,235	757,379	627,407	555,981
Netherland.....	675,105	2.4	749,642	700,725	511,620	439,168
Greek.....	666,471	2.4	525,351	429,913	238,310	78,158
French.....	501,752	1.8	567,288	542,539	544,343	570,034
All remaining.....	989,189	3.6	776,058	1,087,258	1,125,918	1,071,329
Total.....	27,866,627	100.0	27,385,924	28,108,375	26,505,943	25,309,527

VESSELS PAYING TOLLS ON DISPLACEMENT TONNAGE

In the Canal traffic statistics, foreign naval vessels such as colliers, transports, supply ships, etc., with a measurement of 300 net tons (Panama Canal measurement) or more, and floating craft, such as vessels of war, dredges, etc., with a displacement measurement of 500 tons or more, are classified as ocean-going commercial vessels. Statistics on these vessels, except as relates to displacement tonnage, have been included in the traffic summaries shown on the preceding pages. As displacement tonnage cannot be combined with net tonnage, however, the following table shows statistics covering 23 vessels which transited the Canal during the fiscal year 1939 and paid tolls on displacement tonnage:

Nationality	Type of vessel	Number of transits	Displacement tonnage	Tolls
British.....	Warship.....	17	63,417	\$31,708.50
French.....	do.....	1	7,775	3,887.50
Italian.....	do.....	2	18,843	9,421.50
Soviet.....	Survey vessels.....	2	3,200	1,600.00
United States.....	Dredge.....	1	1,296	648.00
Total.....	.....	23	94,531	47,265.50

VESSELS ENTITLED TO FREE TRANSIT

Naval and other vessels owned and operated in the Government service of the United States and Panama, war vessels of Colombia, and vessels transiting solely for repairs at the Balboa shops, are exempt from the payment of tolls, and such vessels are not included in the general transit statistics pertaining to Canal traffic.

The following shows the vessels of each group, the measured tonnage, the amount of tolls to which they would have been subject at the prescribed rates if tolls had been charged against them, and the cargo carried by such vessels in ocean-to-ocean movement:

Class	Number of transits	Panama Canal net tonnage	Displacement tonnage	Tolls	Tons of cargo
U. S. Navy.....	453	263,304	1,644,272	\$1,046,416	47,132
U. S. Army.....	165	250,289	20,536	234,941	48,133
Other U. S. Government.....	7		5,472	2,736	
Total, U. S. Government.....	625	513,593	1,670,280	1,284,093	95,265
Colombian Government.....	9	12,136	366	8,921	
Vessels transiting for repairs only.....	30	57,508		41,406	
Grand total.....	664	583,237	1,670,646	1,334,420	95,265

The above statements include units of the United States Fleet which made two transits during the year—from the Pacific to the Atlantic in January and from the Atlantic to the Pacific in April.

SMALL COMMERCIAL VESSELS TRANSITING CANAL

Transits of small cargo-carrying vessels, and other small craft such as yachts, tugs, etc., of less than 300 tons, Panama Canal measurement, or less than 500 tons, displacement measurement, are excluded from the statistics of ocean-going commercial traffic, although they are not exempt from the payment of tolls. The number of these small vessels transiting the Canal during the year, together with the tonnage, tolls, and the amount of cargo carried, is shown in the following table:

	Number of transits	Tonnage		Tolls	Tons of cargo
		Panama Canal, net	Displacement		
Atlantic to Pacific.....	516	24,565	180	\$19,780.74	8,785
Pacific to Atlantic.....	398	20,992		18,628.20	22,466
Total.....	914	45,557	180	38,408.94	31,251

CARGO SHIPMENTS SEGREGATED BY PRINCIPAL TRADE ROUTES

Cargo shipments through the Panama Canal during the fiscal year 1939 and in the three preceding years, segregated by principal trade routes, are shown in the following tabulation:

	Tons of cargo			
	1939	1938	1937	1936
United States intercoastal:				
Atlantic to Pacific.....	2,391,523	2,341,847	2,575,075	2,578,508
Pacific to Atlantic.....	4,493,203	4,052,728	3,965,082	5,140,567
Total.....	6,884,726	6,394,575	6,540,157	7,719,075
Europe and South America:				
Atlantic to Pacific.....	415,697	453,298	460,777	395,917
Pacific to Atlantic.....	2,481,541	2,520,600	2,661,698	2,330,136
Total.....	2,897,238	2,973,898	3,122,475	2,726,053
United States and Far East (excluding Philippine Islands):				
Atlantic to Pacific.....	2,593,808	3,092,992	3,265,672	1,872,357
Pacific to Atlantic.....	280,593	433,544	662,047	585,961
Total.....	2,874,401	3,526,536	3,927,719	2,458,318
Europe and United States:				
Atlantic to Pacific.....	337,401	449,765	534,749	614,703
Pacific to Atlantic.....	2,349,888	1,972,196	1,435,003	1,788,865
Total.....	2,687,289	2,421,961	1,969,752	2,403,568
East coast United States and west coast South America:				
Atlantic to Pacific.....	192,732	262,207	208,218	199,199
Pacific to Atlantic.....	2,447,257	2,389,649	2,359,431	1,909,185
Total.....	2,639,989	2,651,856	2,567,649	2,108,384
Europe and Canada:				
Atlantic to Pacific.....	78,789	98,702	106,296	95,142
Pacific to Atlantic.....	2,539,436	1,716,157	2,467,874	2,377,190
Total.....	2,618,225	1,814,859	2,574,170	2,472,332
Europe and Australasia:				
Atlantic to Pacific.....	542,770	545,553	473,333	419,824
Pacific to Atlantic.....	759,794	705,917	670,192	636,997
Total.....	1,302,564	1,251,470	1,143,525	1,056,821
United States and Philippine Islands:				
Atlantic to Pacific.....	277,399	217,560	242,612	170,134
Pacific to Atlantic.....	918,937	1,106,130	783,657	809,707
Total.....	1,196,336	1,323,690	1,026,269	979,841
United States and Hawaiian Islands:				
Atlantic to Pacific.....	141,804	151,839	184,517	142,774
Pacific to Atlantic.....	361,857	450,000	506,320	371,892
Total.....	503,661	601,839	690,837	514,666
United States and Australasia:				
Atlantic to Pacific.....	374,544	471,299	316,004	356,117
Pacific to Atlantic.....	86,999	157,048	236,259	155,875
Total.....	461,543	628,347	552,263	511,992
Miscellaneous routes and sailings:				
Atlantic to Pacific.....	1,664,800	1,603,498	1,528,379	1,405,224
Pacific to Atlantic.....	2,135,855	2,193,395	2,465,180	2,149,669
Total.....	3,800,655	3,796,893	3,993,559	3,554,893
Total traffic, all routes:				
Atlantic to Pacific.....	9,011,267	9,688,560	9,895,632	8,249,899
Pacific to Atlantic.....	18,855,360	17,697,364	18,212,743	18,256,044
Total.....	27,866,627	27,385,924	28,108,375	26,505,943

ORIGIN AND DESTINATION OF CARGO

The following table shows the origin and destination, by principal trade areas, of the cargoes carried by steamers passing through the Canal during the past fiscal year; one table covers the movement of cargo from the Atlantic to the Pacific and the other from the Pacific to the Atlantic:

Origin and destination of cargo through the Panama Canal during 1939 from Atlantic to Pacific segregated by countries in principal trade areas

From—	To west coast, North America					To west coast, South America						
	United States	Canada	Central America and Mexico	Balboa, C. Z. ¹	Hawaiian Islands ²	Total	Chile	Colombia	Ecuador	Peru	South America ²	Total
East coast, North America:												
United States:												
North Atlantic ports	Tons 1,747,757	Tons 8,870	Tons 8,906	Tons 5,548	Tons 88,255	Tons 1,850,336	Tons 98,683	Tons 19,886	Tons 9,123	Tons 62,368	Tons ¹ 190,869	Tons ¹ 190,869
South Atlantic ports	583,209	11,160	11,160	2,906	51,688	637,237	---	---	---	1,872	---	1,872
Gulf ports	500,457	13,422	8,704	---	---	---	---	---	---	---	---	---
Total, United States	2,391,523	22,292	31,710	8,514	111,804	2,595,433	98,683	19,886	9,123	64,210	800	192,732
Canada	26,287	46,893	---	---	---	73,180	3,670	---	---	30	---	1,565
Central America and Mexico	---	---	74,857	---	---	74,857	3,670	---	---	---	---	3,670
Cristobal, C. Z. ¹	22,199	684	50,907	65,307	73,790	33,919	34,773	54,773	16,204	25,281	2,800	135,986
West Indies	10,064	8,666	15,342	---	---	99,379	145,057	278	31,851	525	---	177,714
Total, North America	2,450,073	78,535	172,816	73,821	141,801	2,917,019	285,864	74,987	57,181	90,076	3,609	511,607
Europe:												
British Isles	85,590	57,161	6,207	4,398	6,637	148,958	51,638	2,457	1,953	24,081	646	81,675
Belgium	64,403	7,516	20,180	---	---	103,126	44,951	7,344	7,926	30,724	465	91,410
Denmark	2,910	211	---	---	---	3,121	---	---	---	---	---	---
France	18,041	582	12,982	23	---	31,431	5,809	360	10	2,024	30	8,229
Germany	51,705	3,726	38,229	997	3,983	98,640	69,221	10,482	18,982	55,308	1,022	155,075
Italy	8,330	1,328	2,453	2,153	38	14,508	2,530	133	---	2,986	8	3,677
Netherlands	19,542	3,651	151	3,595	---	23,374	6,011	1,965	1,015	9,919	52	18,065
Norway	29,998	309	1,681	---	---	35,583	3,082	2,897	1,039	3,543	---	10,561
Russia	---	---	---	---	---	---	---	---	---	---	---	---
Spain and Portugal	2,331	2	3	---	---	2,336	---	---	---	2	---	2
Sweden	32,189	1,419	8,568	1,170	704	44,080	22,087	4,828	743	7,903	35,651	81,675
Europe ²	22,312	2,351	1,570	---	---	26,233	3,185	4,296	678	2,535	1,905	8,729
Total, Europe	337,401	78,789	91,973	12,487	11,362	531,912	208,517	39,941	32,346	139,775	4,118	415,697
East coast, South America:												
Asia	110,521	6,202	---	12,885	58	129,666	111,340	36,044	---	5,265	---	152,649
Africa (except Egypt)	1,362	---	---	---	---	1,362	1,512	---	---	---	---	1,512
Egypt	51	---	---	---	---	51	11,314	---	---	---	---	11,314
Grand total	2,899,408	103,520	261,089	99,193	153,221	3,590,040	618,567	111,922	80,527	235,116	7,727	1,092,859
Percent of total west-bound cargo:												
1939	32.2	1.8	2.9	1.1	1.7	39.7	6.9	1.6	1.0	2.6	0.1	12.1
1938	30.8	2.2	1.4	1.5	1.6	37.5	6.9	1.2	.9	2.0	0.1	12.0
1937	33.4	2.4	1.5	1.4	1.9	40.6	5.9	1.3	.8	2.8	0.1	10.9

¹ Includes both local and transit cargo.

² General cargo not routed so as to allow segregation between definite countries.

From—	To Australasia				To Asia				Grand total	Percent of total west-bound cargo		
	Australia	New Zealand	Australasia ¹	Total	Philippines Islands	China	Japan	Far East ²		1939	1938	1937
East coast, North America:												
United States:												
North Atlantic ports:												
South Atlantic ports:												
Gulf ports:												
Total, United States:												
Canada:												
Central America and Mexico:												
Cristobal, Canal Zone ¹ :												
West Indies:												
Total, North America:												
Europe:												
British Isles:												
Belgium:												
Denmark:												
France:												
Germany:												
Italy:												
Netherlands:												
Norway:												
Russia:												
Spain and Portugal:												
Sweden:												
Europe ¹ :												
Total, Europe:												
East coast, South America:												
Asia:												
Africa (except Egypt):												
Egypt:												
Grand total:												
Percent of total west-bound cargo:												
1939:												
1938:												
1937:												

¹ Includes both local and transit cargo.

² General cargo not routed so as to allow segregation between definite countries.

Origin and destination of cargo through the Panama Canal during 1939 from Pacific to Atlantic, segregated by countries in principal trade areas

From—	To United States				To other North America				Total, North America	To Europe		
	North Atlantic ports	South Atlantic ports	Gulf ports	Total	Canada	Central America and Mexico	Cristobal, Canal Zone ¹	West Indies		British Isles	Belgium	Den- mark
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
West coast, North America:												
United States	3,948,722	209,047	335,434	4,493,203	19,186	21,995	55,073	487,189	5,076,646	1,342,380	162,479	19,592
Canada	169,878		31,741	201,619	56,398		3,896	31,571	293,484	2,198,993	97,361	7,806
Bahboa, C. Z. ¹											18	
Central America and Mexico	12,702	5,588	12,359	30,649		27	43,472	1,326	75,474	166		
Hawaiian Islands	314,055	1,167	40,635	361,857					361,857	79,174		
Total, North America	4,445,357	215,802	426,169	5,087,328	75,584	22,022	102,441	570,086	5,807,461	3,620,713	259,861	27,398
West coast, South America												
Chile	1,802,977	322,983	129,900	2,255,860	5,903	219	8,491	24,583	2,295,056	222,571	154,476	10,564
Colombia	20,418			20,418			87,907		108,325		97	
Ecuador	34,452			34,452			44,500		89,012		54,977	
Peru	127,870	5,500	3,100	136,470	126,461		1,919	69,290	334,140	202,512	89,608	23,125
South America ²	27			27			369		396		115	
Total, South America	1,985,774	328,483	133,000	2,447,257	132,364	219	143,186	103,903	2,826,929	480,060	244,296	33,789
Australasia:												
Australia	50,524			50,563	76,975	17	1,060	8,456	137,071	83,081	5,766	
New Zealand	27,692		39	27,692	10,571		158	2,204	40,625	375,971	2,638	
Australasia ²	8,744			8,744				106	8,850	137,998	4,055	
Total, Australasia	86,960		39	86,999	87,546	17	1,218	10,766	186,546	597,050	12,459	
Asia:												
Philippine Islands												
China	751,972	272	166,693	918,937	598		1,927		921,462			
Japan	71,382	1,443		73,599			7,992	123	81,714	50,457	2,767	16,977
Far East ¹	168,469	1,914	7,677	178,060	789	5	20,691	972	200,547	37,499	7,282	
Far East ²	26,725		2,179	28,904			1,759	2,000	32,663	33,730		
Total, Asia	1,018,478	3,629	177,323	1,199,530	1,387	5	32,369	3,095	1,236,886	121,686	10,049	16,977
Grand total	7,536,669	547,914	736,531	8,821,114	296,881	22,263	279,214	137,850	10,057,322	4,819,509	526,695	78,164
Percent of total east-bound cargo:												
1939	40.0	2.9	3.9	46.8	1.6	0.1	1.5	3.4	53.4	25.5	2.8	0.4
1938	42.1	2.6	3.0	49.7	2.3	.1	1.5	4.6	58.2	21.1	2.5	.4
1937	39.9	2.5	5.5	47.9	3.2		1.7	4.6	57.4	23.0	2.2	.4

¹ Includes both local and transit cargo.

² General cargo not routed so as to allow segregation between definite countries.

From	To Europe								To miscellaneous areas				Grand total	Percent of total east-bound cargo			
	France	Germany	Italy	Netherlands	Norway	Spain and Portugal	Sweden	Europe ²	Total	South America	Egypt	Asia		Africa ³	1939	1938	1937
West coast, North America:	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons				
	231,956	181,141	37,721	207,547	24,891	7,540	47,573	94,608	2,349,888	45,222	2,480	2,490	44,859	39.9	38.5	33.7	
	38,186	66,169	22,717	59,584	13,053	27,994	27,994	27,994	2,539,436	13,237		385	26,910	15.3	11.1	15.3	
Central America and Mexico:	972	27,567	138	14,733			4,117	405	43,116								
									79,174								
Hawaiian Islands																	
Total, North America:	271,114	274,877	60,606	281,864	37,944		59,230	123,007	5,016,614	58,459	2,480	2,875	71,769	58.2	52.9	53.1	
West Coast, South America:	57,680	242,289	28,730	9,152	8,128	10	70,543	721,048	1,525,191	758							
		6,404					27		6,528								
	53,175	510			12			438	109,112								
	332,125	93,488	631	59,550	20,503	10	8,762	9,201	839,615	11,706							
		705						275	1,095				1	23,672	1	1	
Total, South America:	442,980	343,396	29,361	68,702	28,643	20	79,332	730,962	2,481,541	12,464	24,180		1	5,345,115	28.3	31.6	32.4
Australasia:	230	231					7	8,800	98,115								
	1,537	3,830						4,545	388,603								
	53,558	5,678		4,431			46,360	20,996	273,076								
Total, Australasia:	55,325	9,739		4,513			46,367	34,341	759,794								
Philippine Islands:																	
China:																	
Japan:																	
Far East:																	
Total, Asia:																	
Grand total:	769,419	744,790	89,967	376,489	74,887	20	211,244	929,843	8,620,997	75,736	26,660	2,875	71,770	100.0	100.0	100.0	
Percent of total east-bound cargo:																	
1939:	4.1	4.0	0.5	2.0	0.4		1.0	5.0	45.7	0.4	0.1		0.4	100.0			
1938:	4.0	3.5	.5	1.9	.3		.9	5.0	40.2	.4	.7	0.1	.4	100.0			
1937:	4.6	2.6	.5	2.2	.1		.6	5.1	41.4	.2	.7		.3	100.0			

¹ Includes both local and transit cargo.² General cargo not routed so as to allow segregation between definite countries.³ Other than Egypt.

PRINCIPAL COMMODITIES

Statistics of commodities passing through the Canal are not precise because at the time of transit it is not required that complete manifests of cargo carried by vessels be submitted to the Canal authorities. In lieu of a manifest the master of each vessel is required to submit a cargo declaration, which is a briefly itemized statement, listing the principal items of cargo carried and showing their ports or country of origin and destination. These cargo declarations form the basis of the commodity statistics. There is a natural tendency not to list small miscellaneous shipments but to include them under the head of general cargo. Hence, except in the case of commodities commonly shipped in bulk, such as mineral oils carried in tank ships, wheat, lumber, nitrates, etc., aggregate shipments of the various commodities are likely to be in excess of the tonnage reported during the year and shown in the annual summary. Subject to errors arising from this source, the tonnage of the principal commodities shipped through the Canal during the past 4 years is shown in the following table:

Commodity	Fiscal year ended June 30—			
	1939	1938	1937	1936
ATLANTIC TO PACIFIC				
	<i>Long tons</i>	<i>Long tons</i>	<i>Long tons</i>	<i>Long tons</i>
Manufactures of iron and steel.....	1,495,497	1,859,087	1,770,293	1,379,363
Scrap metal.....	1,200,368	999,151	1,666,030	646,464
Mineral oils.....	1,032,671	907,440	794,702	678,607
Paper and paper products.....	402,264	422,766	431,672	397,196
Metals, various.....	400,285	646,679	379,200	169,141
Cotton, raw.....	250,752	142,121	298,309	331,989
Sulphur.....	234,879	297,283	253,294	224,734
Phosphates.....	202,981	328,079	310,015	289,870
Tin plate.....	194,186	237,997	272,772	246,902
Cement.....	160,271	153,558	183,978	126,596
Machinery.....	158,835	167,698	155,206	137,261
Automobiles.....	152,131	207,878	185,983	204,996
Coal and coke.....	147,273	137,404	124,467	132,956
Canned goods (food products).....	132,228	133,111	136,885	135,627
Chemicals (unclassified).....	127,858	108,861	119,437	116,066
Textiles.....	98,325	94,625	99,337	108,733
Railroad material.....	82,235	77,888	21,986	61,274
Automobile accessories.....	80,693	91,769	86,289	100,625
Liquors and wines.....	74,093	64,981	58,826	66,130
Coffee.....	73,314	67,641	44,529	61,593
Asphalt and tar.....	71,931	151,527	147,193	139,864
Tobacco.....	61,441	52,489	69,407	51,707
Glass and glassware.....	60,005	59,734	62,226	65,202
Wood pulp.....	59,834	113,180	105,775	55,529
Lumber and mill products.....	58,157	42,026	46,700	47,835
Salt.....	54,751	45,967	45,121	48,485
Nitrate.....	54,181	68,702	68,078	103,478
Ammonium compounds.....	51,062	70,924	60,141	137,338
Oilseeds.....	45,676	17,917	18,831	6,315
Ores, various.....	45,620	103,902	120,233	214,711
Agricultural implements.....	43,276	59,838	47,456	36,556
Rosin.....	41,303	35,304	57,793	55,527
Soda and sodium compounds.....	39,694	61,948	50,888	37,255
Electrical apparatus.....	39,207	25,762	16,469	12,527
Sugar.....	36,832	56,941	74,185	94,607
Paints and varnishes.....	36,057	32,480	38,594	38,496
Asbestos.....	35,395	45,659	34,443	21,535
Oils, vegetable.....	32,002	29,341	26,116	30,939
Drugs and medicines.....	29,114	24,431	16,507	15,935
Soap and products.....	28,630	22,683	17,075	21,429

Commodity	Fiscal year ended June 30—			
	1939	1938	1937	1936
ATLANTIC TO PACIFIC—continued				
Potash.....	<i>Long tons</i> 27,859	<i>Long tons</i> 40,288	<i>Long tons</i> 27,290	<i>Long tons</i> 43,826
Oilseed cake and meal.....	27,504	9,739	1,750	7,386
Floor coverings.....	27,237	21,997	17,172	17,588
Slag.....	26,769	62,546	50,299	17,093
Creosote.....	26,399	30,657	34,880	44,615
Sand.....	25,788	56,973	52,160	63,992
Groceries (unclassified).....	24,794	22,434	9,826	10,345
Flour.....	23,445	9,271	12,991	17,209
Clays.....	21,461	20,913	24,929	14,456
Extract, quebracho.....	20,652	12,357	9,129	8,518
Fertilizers (unclassified).....	20,633	30,296	23,628	28,204
Slate.....	20,616	10,875	10,610	12,527
All others.....	1,083,803	1,093,743	1,104,536	1,113,137
Total.....	9,011,267	9,688,560	9,895,632	8,249,899
PACIFIC TO ATLANTIC				
Lumber.....	3,191,093	2,850,953	2,748,917	2,764,091
Mineral oils.....	2,777,201	2,874,809	3,571,626	3,277,078
Ores.....	1,991,690	2,126,657	1,851,254	1,496,021
Wheat.....	1,539,474	705,500	1,218,581	1,480,187
Nitrate.....	1,444,148	1,401,003	1,328,482	1,181,197
Sugar.....	1,329,276	1,486,516	1,358,948	1,391,909
Canned goods (food products).....	1,232,636	991,436	1,092,356	1,050,855
Metals, various.....	674,314	698,170	653,250	599,388
Fruit, fresh.....	419,109	347,527	216,770	336,367
Fruit, dried.....	337,769	291,444	233,957	309,096
Cold storage (food products) ¹	335,874	334,659	304,332	324,092
Barley.....	259,612	237,137	166,578	221,624
Soya beans.....	236,099	52,934	107,612	239,860
Wood pulp.....	235,768	313,969	140,612	164,001
Coffee.....	185,341	174,778	177,209	158,315
Oils, vegetable.....	174,944	170,686	197,000	221,255
Beans, edible, dry.....	165,185	175,917	134,239	171,444
Copra.....	156,657	163,521	155,413	126,591
Flour.....	153,642	233,810	259,389	337,487
Wool.....	138,622	123,297	159,586	161,528
Paper and paper products.....	120,723	137,578	122,894	131,368
Cotton, raw.....	106,211	127,473	114,087	120,014
Oats.....	102,650	71,576	100,629	69,916
Molasses and sirups.....	101,750	47,377	127,381	132,302
Phosphates.....	87,715	44,933	39,280	58,175
Borax.....	74,239	89,831	96,619	101,012
Oilseed cake and meal.....	62,925	63,798	76,253	62,687
Asphalt and tar.....	61,861	107,187	65,068	52,302
Skins and hides.....	58,760	56,346	72,761	72,782
Potash.....	48,287	33,731	32,041	27,965
Bananas.....	45,557	53,319	38,501	66,153
Fish oil.....	34,433	18,707	20,218	16,226
Fish meal.....	32,473	35,866	37,901	51,922
Rice.....	31,127	57,109	44,906	45,614
Textiles.....	30,986	51,009	75,652	42,753
Tallow.....	30,864	26,831	32,050	24,124
Wines.....	29,879	28,718	28,571	25,848
Guano.....	27,830	—	32,230	31,201
Coconuts and products.....	27,064	22,747	14,933	29,894
Porcelainware.....	25,324	45,934	51,608	50,194
All others.....	736,248	822,571	913,059	1,031,206
Total.....	18,855,360	17,697,364	18,212,743	18,256,044

¹ Does not include fresh fruit.

CLASSIFICATION OF VESSELS BETWEEN LADEN AND BALLAST TRAFFIC

The following table summarizes the ocean-going commercial traffic through the Canal during the fiscal year 1939 segregated between laden ships and those in ballast, as well as between tankers, ore ships, passenger ships, general cargo ships, and those not designed to carry cargo, and also between vessels of United States registry and those of all other nationalities:

Classification	Vessels of United States registry			Vessels of foreign registry			Total traffic	
	Atlantic to Pacific	Pacific to Atlantic	Total	Atlantic to Pacific	Pacific to Atlantic	Total	Atlantic to Pacific	Total
CARGO AND CARGO-PASSENGER SHIPS								
Tank ships, laden:								
Number of transits	20	111	131	61	147	208	258	339
Panama Canal net tonnage	101,037	634,539	735,576	309,628	880,605	1,187,233	1,515,144	1,622,899
Tolls	\$90,933	\$571,085	\$762,018	\$475,965	\$792,545	\$1,068,510	\$1,363,610	\$1,730,528
Cargo (tons)	111,623	1,197,683	1,309,286	572,391	1,749,678	2,322,039	2,447,311	3,631,355
Tank ships, ballast:								
Number of transits	96	—	96	125	30	145	30	241
Panama Canal net tonnage	552,807	—	552,807	781,967	103,789	885,751	103,789	1,438,558
Tolls	\$398,021	—	\$398,021	\$543,013	—	\$837,741	\$74,728	\$1,033,762
One ships, laden:								
Number of transits	64	64	128	—	19	19	—	83
Panama Canal net tonnage	292,399	292,399	584,798	—	83,296	83,296	375,666	375,666
Tolls	\$263,159	\$263,159	\$526,318	—	\$74,966	\$74,966	\$338,125	\$338,125
Cargo (tons)	1,194,100	1,194,100	2,388,200	—	418,400	418,400	1,612,500	1,612,500
One ships, ballast:								
Number of transits	61	—	61	19	—	19	—	80
Panama Canal net tonnage	277,754	—	277,754	83,296	—	83,296	361,050	361,050
Tolls	\$190,983	—	\$190,983	\$69,973	—	\$69,973	\$259,956	\$259,956
Passenger ships, laden:								
Number of transits	87	77	164	316	303	619	403	783
Panama Canal net tonnage	522,205	430,373	952,578	1,022,321	1,518,308	2,540,629	2,144,536	4,102,207
Tolls	\$469,985	\$395,436	\$865,421	\$1,190,089	\$1,396,477	\$2,586,566	\$1,930,074	\$3,691,987
Cargo (tons)	248,308	371,418	619,726	842,690	1,592,639	2,435,319	1,090,998	3,025,075
Passenger ships, ballast:								
Number of transits	—	—	—	2	—	2	—	2
Panama Canal net tonnage	—	—	—	2,167	—	2,167	—	2,167
Tolls	—	—	—	\$1,560	—	\$1,560	—	\$1,560
General cargo ships, laden:								
Number of transits	620	612	1,232	1,063	1,364	2,427	1,692	3,668
Panama Canal net tonnage	3,006,815	2,904,163	5,910,978	4,521,617	5,602,109	10,123,726	7,528,432	16,094,791
Tolls	\$2,706,133	\$2,613,747	\$5,319,880	\$4,069,455	\$5,095,979	\$9,165,434	\$6,775,588	\$14,465,314
Cargo (tons)	2,572,255	4,214,013	6,786,268	4,064,000	8,147,429	12,811,429	7,236,255	19,597,697
General cargo ships, ballast:								
Number of transits	17	2	19	629	17	646	646	665
Panama Canal net tonnage	52,788	9,358	62,146	2,769,028	21,634	2,790,662	2,821,816	2,852,808
Tolls	\$38,007	\$6,738	\$44,745	\$1,094,151	\$15,577	\$2,009,728	\$2,032,158	\$2,054,473

OTHER TYPE VESSELS

	6	5	11	3	2	5	9	7	10
Yachts, ballast:									
Number of transits.....			11	1,885	1,424	3,309	5,184	4,397	9,881
Panama Canal net tonnage.....	3,299	2,973	6,272	\$1,357	\$1,025	\$2,382	\$9,732	\$3,166	\$6,898
Tolls.....	\$2,375	\$2,141	\$4,516						
Naval vessels:									
Number of transits.....				8	12	20	8	12	20
Displacement tonnage.....				20,957	69,078	90,035	20,957	69,078	90,035
Tolls.....				\$10,479	\$34,539	\$45,018	\$10,479	\$34,539	\$45,018
All other type vessels:									
Number of transits.....		1	1	4	1	5	4	2	6
Panama Canal net tonnage.....				9,915	423	10,338	9,915	423	10,338
Displacement tonnage.....		1,296	1,296	3,200	3,200	3,200	3,200	1,296	4,496
Tolls.....		\$648	\$648	\$10,447	\$305	\$10,752	\$10,447	\$353	\$11,400
SUMMARY									
Total cargo and cargo-passenger ships, laden:									
Number of transits.....	736	864	1,600	1,440	1,833	3,273	2,176	2,697	4,873
Panama Canal net tonnage.....	3,630,057	4,270,474	7,900,531	6,450,566	8,144,408	14,594,974	10,080,623	12,414,882	22,495,505
Tolls.....	\$3,267,051	\$3,843,427	\$7,110,478	\$5,805,509	\$7,329,967	\$13,135,476	\$9,072,560	\$11,173,384	\$20,245,954
Cargo (tons):	2,932,185	6,977,194	9,909,380	6,079,081	11,878,166	17,957,247	9,011,267	18,855,360	27,856,627
Total cargo and cargo-passenger ships, ballast:									
Number of transits.....	174	2	176	775	37	812	949	39	988
Panama Canal net tonnage.....	\$83,349	9,358	892,707	3,636,453	125,423	3,761,876	4,519,802	134,781	4,654,583
Tolls.....	\$636,011	\$6,738	\$642,749	\$2,618,697	\$90,305	\$2,703,002	\$3,254,708	\$97,043	\$3,351,751
Total other type ships:									
Number of transits.....	6	6	12	15	15	30	21	21	42
Panama Canal net tonnage.....	3,299	2,973	11,800	11,800	1,847	13,647	15,099	4,820	19,919
Displacement tonnage.....		1,296	1,296	24,157	69,078	93,235	70,374	93,235	94,531
Tolls.....	\$2,375	\$2,789	\$5,104	\$22,283	\$35,869	\$58,152	\$24,658	\$38,658	\$63,316
Grand total ships:									
Number of transits.....	916	872	1,788	2,230	1,885	4,115	3,146	2,757	5,903
Panama Canal net tonnage.....	4,516,705	4,282,805	8,799,510	10,098,819	8,271,678	18,370,497	14,615,524	12,554,483	27,170,007
Displacement tonnage.....		1,296	1,296	24,157	69,078	93,235	70,374	93,235	94,531
Tolls.....	\$3,905,437	\$3,852,941	\$7,758,391	\$8,446,489	\$7,456,141	\$15,902,630	\$12,351,926	\$11,309,095	\$23,661,021
Cargo (tons):	2,932,186	6,977,194	9,909,380	6,079,081	11,878,166	17,957,247	9,011,267	18,855,360	27,866,627

LADEN AND BALLAST TRAFFIC BY NATIONALITY

In the table below the ships of each nationality have been segregated to show separate statistics on vessels which were carrying cargo and/or passengers at the time of transiting the Canal and those which passed through in ballast:

Nationality	Number of transits		Panama Canal net tonnage		Tolls	
	Laden	Ballast	Laden	Ballast	Laden	Ballast
Belgian	1		5,900		\$5,310	
British	1,110	375	5,867,990	1,802,158	5,281,191	\$1,297,554
Chilean	21	5	99,745	6,595	89,771	4,748
Danish	167	33	659,328	98,693	593,395	71,059
French	96	10	483,664	47,574	435,298	34,253
German	348	13	1,399,100	55,602	1,259,190	40,603
Greek	84	33	392,269	161,730	353,012	116,446
Honduran	29	8	46,906	12,860	42,215	9,259
Italian	53	4	308,045	16,881	277,241	12,154
Japanese	253	8	1,453,187	65,067	1,307,868	46,848
Latvian	1		2,738		2,464	
Netherland	286	26	679,659	121,968	611,693	89,977
Norwegian	496	208	2,254,468	944,884	2,029,021	680,317
Panamaian	163	30	226,028	132,985	203,425	95,719
Peruvian	6		12,088		10,879	
Philippine	5		24,025		21,623	
Soviet	6		17,654		15,889	
Swedish	116	41	328,517	191,344	475,665	137,768
United States	1,600	187	7,900,531	808,979	7,110,478	647,265
Venezuelan	1	1	1,734	1,734	1,561	1,249
Yugoslavian	33	23	143,927	100,450	129,534	72,324
Total	4,875	1,005	22,507,503	4,602,501	\$20,256,733	\$3,357,003

AVERAGE TONNAGE, TOLLS, AND TONS OF CARGO PER CARGO-CARRYING VESSEL

The average measurement tonnage, tolls, and tons of cargo per cargo-carrying vessel of 300 net tons and over, Panama Canal measurement, transiting the Panama Canal during the past 3 years are shown in the following tabulation:

	Fiscal year 1939	Fiscal year 1938	Fiscal year 1937
Measured tonnage:			
Panama Canal net	4,633	4,700	4,720
Registered gross	5,896	5,979	6,086
Registered net	3,537	3,564	3,607
Tolls	\$4,027.30	\$4,203.75	\$4,310.93
Tons of cargo (including vessels in ballast)	4,751	4,977	5,255
Tons of cargo (laden vessels only)	5,719	5,784	6,195

¹ Estimated tonnage based on revised measurement rules which became effective March 1, 1938.

STEAM, MOTOR, AND OTHER VESSELS

Of the 5,903 ocean-going commercial vessels transiting the Canal during the fiscal year 1939, 3,463 were steamers, 2,398 motorships, and the remainder, 42, were unclassified naval vessels, yachts, etc. For the past 5 years the proportions of these classes have been as follows:

	1939	1938	1937	1936	1935
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Steamers.....	58.7	59.7	60.0	63.7	65.4
Motorships.....	40.6	39.9	39.3	35.8	33.8
Miscellaneous.....	.7	.4	.7	.5	.8
Total.....	100.0	100.0	100.0	100.0	100.0

Of the 3,463 steamers transiting the Canal during the past fiscal year, 2,444 burned oil and 1,019 burned coal. For the past 5 years the proportions of each class have been as follows:

	1939	1938	1937	1936	1935
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Oil burning.....	70.6	72.7	69.2	72.9	74.8
Coal burning.....	29.4	27.3	30.8	27.1	24.3
Either oil or coal.....					.9
Total.....	100.0	100.0	100.0	100.0	100.0

FREQUENCY OF TRANSITS OF VESSELS THROUGH THE PANAMA CANAL

During the fiscal year 1939, 1,609 individual ocean-going commercial vessels, representing 21 nationalities, passed through the Panama Canal. In the aggregate these vessels made a total of 5,903 transits. The number of transits made by individual ships varied from 1 to 86 and averaged 3.67. The greatest number, amounting to 86, was made by the small Panamanian steamer *Istmo*, plying between Cristobal and the west coast of Colombia.

Although vessels of United States registry led in the number of transits during the year, Great Britain, which ranked second, was first in the number of individual vessels, with 602. There were 321 individual vessels of United States registry which passed through during the year.

The following table shows the number of individual ships, the frequency of transits per vessel, the total transits for the year, and the average number of transits per individual vessel, segregated by nationality:

Vessels making indicated number of transits during fiscal year 1939

Nationality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	23	24	25	26	27	28	30	31	32	34	47	50	55	58	60	61	74	86	93	Total ships	Total transits	Average number of transits				
Belgian	1																																								1	1.00					
British	228	192	61	43	23	33	11	4	1	2																															602	1,502	2.50				
Chilean	5	1					2																																		9	36	2.89				
Danish	17	4	4	5	5	4	4	1		3	2																														50	200	4.00				
French	5	10	6	4	4	4	2																																		31	107	3.45				
German	18	20	11	6	1	7	4	5	2	1																															79	301	4.57				
Greek	33	20	3	5	3																																					64	117	1.83			
Honduran																																									3	37	12.33				
Italian	5	3																																								15	89	3.93			
Japanese	13	17	12	11	16	9																																				78	201	3.35			
Latvian																																									1	1.00					
Netherlands	10	6	1	5	3	7	3																																			38	312	8.21			
Norwegian	74	57	17	18	10	8	10	9	4	5	1	1																														217	704	3.24			
Panamaian	6	6			2		2	1	2																																	22	133	8.77			
Peruvian																																											2	6	3.00		
Philippine																																											1	5	5.00		
Soviet	6	1																																								7	8	1.14			
Swedish	18	12	4	4	5	4																																				49	157	3.20			
United States	40	58	10	27	15	27	44	47	15	9	2																															321	1,788	5.57			
Venezuelan																																											2	2	2.00		
Yugoslavian	4	5	2	2	2	3																																				18	56	3.11			
Total, 1939	484	415	134	135	90	111	83	69	23	20	5	2	2	3	2	4	4		6	3	2	1																					1,609	5,903	3.67		
Total, 1938	463	369	162	133	77	122	74	45	30	13	6	4	2	3	3	1	3		4	3																								1,558	5,524	3.55	
Total, 1937	486	384	186	137	128	154	45	18	6	4	1	4	5	6	2	2	5		7	2																									1,593	5,387	3.38

The following tabulation shows for the fiscal year 1939 the number of vessels making one or more transits through the Panama Canal, the percent which each class formed of the total number of vessels (1,609), their aggregate number of transits, and their percent of the total ocean-going commercial transits (5,903):

Number of transits	Number of vessels	Percent of individual vessels (1,609)	Total number of transits	Percent of total Canal transits (5,903)	Number of transits	Number of vessels	Percent of individual vessels (1,609)	Total number of transits	Percent of total Canal transits (5,903)
1-----	484	30.1	484	8.2	17-----	4	0.2	68	1.2
2-----	415	25.8	830	14.1	18-----	6	.4	108	1.8
3-----	134	8.3	402	6.8	19-----	3	.2	57	1.0
4-----	135	8.4	540	9.1	20-----	2	.1	40	.7
5-----	90	5.6	450	7.6	21-----	1	.1	21	.4
6-----	111	6.9	666	11.3	24-----	1	.1	24	.4
7-----	83	5.1	581	9.8	25-----	1	.1	25	.4
8-----	69	4.3	552	9.4	26-----	4	.2	104	1.8
9-----	23	1.4	207	3.5	28-----	1	.1	28	.5
10-----	20	1.2	200	3.4	55-----	1	.1	55	.9
11-----	5	.3	55	.9	60-----	1	.1	60	1.0
12-----	2	.1	24	.4	74-----	1	.1	74	1.2
13-----	2	.1	26	.4	86-----	1	.1	86	1.5
14-----	3	.2	42	.7					
15-----	2	.1	30	.5	Total-----	1,609	100.0	5,903	100.0
16-----	4	.2	64	1.1					

GROSS TONNAGE OF VESSELS

The 5,903 ocean-going commercial vessels which transited the Canal in the fiscal year 1939 included 5,880 merchant vessels, yachts, etc., paying on the basis of net tonnage, and 23 vessels paying tolls on the basis of displacement tonnage. Of the 5,880 merchant vessels, yachts, etc., 2,422, or 41.2 percent, were vessels of from 4,000 to 6,000 registered gross tons. Vessels between 6,000 and 8,000 tons made up 24.4 percent of the total and those from 8,000 to 10,000 tons, 12.2 percent. Vessels under 2,000 tons accounted for 10.7 percent of the total, while those of 10,000 tons and over represented 5.7 percent. The average registered gross tonnage of all transits was 5,881 as compared with 5,972 for the previous year, a decrease of 1.5 percent.

The following tabulation shows the ocean-going commercial vessels, excluding those based on displacement tonnage, in groups according to registered gross tonnage, segregated by nationality, with average tonnages for 1939 and 1938 and group percentages for the past year:

Segregation of transits by registered gross tonnage of vessels, fiscal year 1939

Nationality	Under 2,000	2,000 to 3,999 in- clu- sive	4,000 to 5,999 in- clu- sive	6,000 to 7,999 in- clu- sive	8,000 to 9,999 in- clu- sive	10,000 to 11,999 in- clu- sive	12,000 to 13,999 in- clu- sive	14,000 to 15,999 in- clu- sive	16,000 to 17,999 in- clu- sive	18,000 to 19,999 in- clu- sive	20,000 and over	Total	Registered gross tonnage	Average regis- tered gross ton- nage per vessel, fiscal year
Belgian	90	31	763	306	155	1	14	33	30		1	1,455	8,718	6,695
British	2	5		19								26	9,492,315	6,372
Chinese													156,125	6,065
Danish	73	33	47	16	11	20						200	865,940	5,013
Estonian														4,421
Finnish	2	2	32	43	23	1								3,198
French	107	29	89	97	29	4						106	710,044	4,746
German		37	97	20					8		1	361	1,830,050	6,999
Greek												117	627,338	5,069
Honduran												37	100,475	5,362
Hungarian														2,658
Italian			6	25	7	19						57	463,312	5,213
Japanese			10	142	100	7			1			261	2,021,556	4,092
Latvian		1												8,332
Netherlands	193	7	45	23	30	12						1	2,021,556	7,745
Norwegian	14	120	386	106	55	23					1	312	943,574	3,204
Panamanian	132	20	6	15	5	15						704	3,770,432	3,210
Peruvian		6										193	493,803	3,024
Philippine				5								6	17,785	5,356
Soviet	1	1	4									5	24,060	2,770
Spanish												6	24,060	2,852
Swedish	2	22	69	8	7	10								2,151
United States	11	22	821	691	292	35		38				157	1,254,907	2,650
Venezuelan		2										2	11,494,008	6,195
Yugoslav		1	49	6								56	301,748	7,785
Total	630	339	2,422	1,432	715	211	14	71	39	2	5	5,880	34,583,055	6,432
Percent of total	10.7	5.8	41.2	21.4	12.2	3.6	0.2	1.2	0.6	0.1	0.1	100.0		5,881

¹ This group includes the following: British, Franconia, 20,175 tons; German, Bremen, 51,731 tons; Netherlands, Nieuw Amsterdam, 36,287 tons; and United States, Washington (2 transits), 21,240 tons.

² 23 vessels paying tolls on displacement—17 British, 1 French, 2 Italian, 2 Soviet, and 1 United States—are not included.

SUMMARY OF PASSENGER MOVEMENT AT CANAL DURING 1939

The following tabulation shows by months the number of passengers, exclusive of transients, disembarking at Canal Zone ports during the fiscal year 1939, segregated as between first class and all others, with comparative totals for the fiscal years 1938 and 1937:

Month	Disembarking			Embarking		
	First class	Others	Total	First class	Others	Total
July.....	1,433	1,286	2,719	1,304	1,577	2,881
August.....	1,786	1,829	3,615	1,918	1,265	3,183
September.....	1,743	2,012	3,755	1,652	1,545	3,197
October.....	1,576	1,136	2,712	1,413	1,259	2,672
November.....	1,488	1,228	2,716	1,137	1,649	2,786
December.....	1,564	863	2,427	1,130	1,179	2,309
January.....	1,690	879	2,569	1,156	1,105	2,262
February.....	1,329	915	2,244	1,367	778	2,145
March.....	1,526	1,550	3,076	1,557	1,816	3,373
April.....	1,462	1,613	3,075	1,934	1,528	3,462
May.....	1,476	1,100	2,576	1,912	1,141	3,053
June.....	2,000	1,957	3,957	2,353	1,766	4,119
Total 1939.....	19,073	16,368	35,441	18,833	16,609	35,442
Total, 1938.....	19,302	21,784	41,086	19,588	19,300	38,888
Total, 1937.....	19,128	18,934	38,062	19,936	18,082	38,018

As compared with 1938, the fiscal year 1939 showed a decrease of 13.7 percent in the number of arrivals and in comparison with 1937 it showed a decrease of 6.9 percent; in the number of departures there was a decrease of 8.9 percent in comparison with 1938 and 6.8 percent under 1937.

The following table shows the passenger traffic through the ports of Cristobal and Balboa during the past 3 years:

	Port of Cristobal			Port of Balboa		
	1939	1938	1937	1939	1938	1937
Passengers disembarking.....	26,799	28,620	25,263	8,642	12,466	12,799
Passengers embarking.....	26,448	26,474	24,860	8,994	12,114	13,158

A further segregation of the passenger movement shows that 28,823 incoming and 26,952 outgoing passengers came from or were destined to ports of the Atlantic, and 6,618 incoming and 8,490 outgoing passengers were brought from or were destined to ports of the Pacific.

TRANSIENT PASSENGERS

In addition to the figures shown above of passengers disembarking and embarking, there were 114,053 transient passengers brought to the Isthmus by vessels calling at Canal ports during the fiscal year 1939. For the fiscal year 1938, there were 131,837, and in the fiscal year 1937 there were 136,085. The number in 1939 decreased 17,784, or 13.5 percent, in comparison with those in 1938, and registered a loss of 22,032, or 16.2 percent, under 1937. Most of these passengers

came ashore for short periods but since they departed on the same vessels on which they arrived they are not included in the tabulation of passengers ending or beginning voyages at the Isthmus. The origin and destination of these transient passengers are indicated in the following tabulation:

	Fiscal year 1939	Fiscal year 1938	Fiscal year 1937
Remaining on board vessels transiting Canal:			
Atlantic to Pacific.....	48,058	54,872	55,149
Pacific to Atlantic.....	30,750	41,947	41,268
Remaining on board vessels entering port but not transiting Canal:			
Atlantic to Atlantic.....	33,996	33,914	36,930
Pacific to Pacific.....	1,249	1,104	2,738
Total.....	114,053	131,837	136,085

The transient passengers included a number visiting the Canal as members of special tourist cruises. Many of these crossed the Isthmus by train from Colon to Gamboa, proceeding from there through the Gaillard Cut to Pedro Miguel by small steamer, and finally completing the trip to Balboa by rail or automobile. Similar combination trips were made in the opposite direction. During the past year 59 trips of these types were conducted, for a total of 7,355 passengers.

REVISED MEASUREMENT RULES FOR TRANSITING VESSELS

The measurement of vessels under the revised Panama Canal rules which became effective March 1, 1938, continued throughout the year. Through the cooperation of measurement officials in the United States and in foreign countries, revised tonnage figures have been determined for the issuance of new Panama Canal tonnage certificates with little delay to vessels arriving for transit of the Canal.

CANAL OPERATION AND MAINTENANCE

HOURS OF OPERATION

Dispatching of ships through the Canal is conducted on schedules. Vessels awaiting transit begin moving through the Canal from the terminal ports at 6 a. m. and dispatches are made thereafter from each terminus at intervals of about half an hour. The following is a summary of the arrangements in effect at the end of the fiscal year:

From Cristobal Harbor, first ship at 6 a. m., last at about 3:30 p. m.; from Balboa anchorage, first ship at 6 a. m., last at 2:30 p. m. This applies to vessels averaging 10 to 12 knots. In case a vessel is capable of 15 knots, departure may be made up to about 3 p. m. from Balboa and 4 p. m. from Cristobal.

Tankers with inflammable cargoes are dispatched at the discretion of the Captain of the Port and are not permitted to proceed unless

they can clear Gaillard Cut before dark. Heavy tankers carrying gasoline cargo are usually restricted to the early morning schedules, leaving at 6, 6:30, and 7 a. m., to assure their not meeting other vessels in Gaillard Cut.

The volume of traffic at present is not sufficient to justify 24-hour operation.

OPERATING SCHEDULES OF LOCKS

At the end of the fiscal year, the schedules of operating shifts of the locks were as follows:

Gatun:

- 7 a. m. to 3 p. m.—8 locomotives.
- 7 a. m. to 3 p. m.—6 locomotives.
- 3 p. m. to 11 p. m.—8 locomotives.
- 3 p. m. to 11 p. m.—6 locomotives.

Pedro Miguel:

- 8 a. m. to 4 p. m.—8 locomotives.
- 9:30 a. m. to 5:30 p. m.—6 locomotives.
- 2 p. m. to 10 p. m.—8 locomotives.

Miraflores:

- 7 a. m. to 3 p. m.—8 locomotives.
- 9:30 a. m. to 5:30 p. m.—8 locomotives.
- 3 p. m. to 11 p. m.—8 locomotives.

LOCKAGES AND LOCK MAINTENANCE

Lockages and vessels handled are shown in the following table by months for the past fiscal year, with corresponding totals for the past 5 years:

Month	Gatun		Pedro Miguel		Miraflores		Total	
	Lockages	Vessels	Lockages	Vessels	Lockages	Vessels	Lockages	Vessels
1938								
July	437	566	465	594	458	573	1,360	1,733
August	457	650	506	675	499	639	1,492	1,964
September	445	589	459	575	456	582	1,360	1,746
October	501	669	503	620	502	631	1,506	1,920
November	526	671	546	667	539	668	1,611	2,009
December	510	637	527	670	523	666	1,559	1,973
1939								
January	572	796	594	805	590	800	1,756	2,401
February	475	623	505	658	502	648	1,482	1,929
March	540	698	564	732	556	724	1,650	2,154
April	535	723	562	739	555	725	1,653	2,188
May	524	679	529	682	529	682	1,582	2,043
June	502	625	522	647	512	649	1,536	1,921
Total	6,054	7,929	6,283	8,064	6,221	7,988	18,558	23,981
Fiscal year:								
1938	5,651	7,385	5,870	7,420	5,813	7,316	17,334	22,121
1937	5,504	7,156	5,735	7,474	5,608	7,218	16,847	21,848
1936	5,334	6,755	5,548	6,930	5,538	6,866	16,420	20,551
1935	5,316	6,893	5,490	6,859	5,481	6,837	16,287	20,589
1934	5,365	6,593	5,507	6,745	5,483	6,705	16,355	20,043

The lock-operating machinery functioned smoothly throughout the year except for a few incidents due to faulty operation or minor failure

of equipment. The following summary includes all delays to vessels while transiting the locks, due to the incidents mentioned:

Locks	Number of vessels delayed	Aggregate delay caused all vessels
Gatun	24	4 hours 11 minutes.
Pedro Miguel	17	4 hours 50 minutes.
Miraflores	6	48 minutes.
Total	47	9 hours 49 minutes.

The average number of lockages made daily, and the average number of vessels handled per lockage, during each of the past 5 fiscal years, are shown in the table following:

Fiscal year	Average number of lockages per day			Average number of vessels handled per lockage		
	Gatun	Pedro Miguel	Miraflores	Gatun	Pedro Miguel	Miraflores
1935	15.6	15.0	15.0	1.30	1.25	1.25
1936	14.6	15.2	15.1	1.27	1.25	1.24
1937	15.1	15.7	15.1	1.30	1.30	1.29
1938	15.5	16.1	15.9	1.31	1.26	1.26
1939	16.6	17.2	17.0	1.31	1.28	1.28

ATLANTIC LOCKS OVERHAUL

The quadrennial overhaul of the Atlantic locks was started at 7 a. m. on January 23, and was completed at 3 p. m. on April 5, the total elapsed time being 72½ days. The mechanical work incidental to overhaul was carried forward on a two-shift, 5-day-a-week basis and painting on a two-shift, 6-day-a-week basis.

The extra gold force employed for the overhaul totaled 143 employees of which 40 were brought from the United States and the remaining 103 were borrowed from other divisions, transferred temporarily from the Pacific locks, or employed locally. The extra silver force necessary varied with the requirements, a maximum of 800 being employed at one time.

During the overhaul period the locks were operated on a 24-hour basis to accommodate shipping and prevent undue delay for transiting vessels. To meet this condition it was necessary to employ extra clerks and watchmen at the Pacific locks. A brief résumé of the work performed is given below.

As it was found unnecessary to remove the stems of the cylindrical valves, the work on these valves consisted in renewing rubber seals and replacing corroded bolts, studs, and nuts. Body castings were enameled and the outer side of the valves painted with red lead. Of the total of 56 rising stem valves, 54 were removed, these being replaced by 29 spare valves and 25 old reconditioned valves. The

usual replacements were made of seals, roller train track plates, and front wearing plates. In general, the condition of the valves was considered satisfactory. All but 2 valves between the upper and middle and middle and lower levels were equipped with stabilizers to prevent vibration of the roller trains, when valves are raised, thus reducing wear on tracks, rollers, and guide bars.

As no miter gates were removed, the work performed on the gates consisted of cleaning, painting, and renewal of rubber seals, angles, wood sills and seals. On all but the four upper guard gates holes were drilled through the upper pintle casting and bushing to the aperture between the pintle and bushing. After packing around the pintle below the bushing the space was flooded with lubricant. It is anticipated that this will prevent scouring and wear on the bushings when gates are operated in the dry.

The steel plates on the gate surfaces below sea level have become pitted and this condition is gradually becoming worse. The gate surfaces were cleaned, the holes were filled by extensive welding and then the surfaces were enameled.

POWER FOR CANAL OPERATION

The power system was operated throughout the year with a combined generator output of 86,185,409 kilowatt-hours as compared with a combined generator output of 83,441,651 kilowatt-hours for the preceding fiscal year. During the year 79,532,349 kilowatt-hours were distributed to consumers, as compared with 75,970,841 kilowatt-hours for the preceding year. From the above there resulted a transmission, transformation, and distribution loss of 6,653,060 kilowatt-hours, or 7.72 percent, compared with a loss of 7,740,810 kilowatt-hours, or 8.49 percent, for the preceding year. The maximum peak load carried on the system during the past fiscal year was 21,300 kilowatt-hours, occurring on November 11, 1938.

The Madden hydroelectric generating station operated throughout the year, generating approximately 65.29 percent of the total power output. The Gatun hydroelectric station generated approximately 34.70 percent of the total power output, while the Miraflores Diesel-electric generating station generated 0.01 percent of the total power output. The amounts of water consumed for generation of power were 405 cubic feet per kilowatt-hour at Madden station and 950 cubic feet per kilowatt-hour at Gatun station. The Miraflores Diesel-electric generating station was maintained throughout the year on a full-time, stand-by basis. Load was carried by this station on only one occasion during the year.

There were 4 temporary failures of transmission-line service, in whole or in part. Two of these were caused by the failure of oil

circuit breakers, one was caused by a grass fire, and the other by lightning.

The work started during the previous fiscal year in connection with the relocation of 6.6 kv. switch gear at the Gatun hydroelectric station was completed. The benefits obtained from this change in switch gear consist of the elimination of all obsolete, low-rupturing capacity switch gear from this particular station and separation of the feeders into two isolated groups at either end of the sectionalized main busses, whereas previously all feeders were concentrated at one end of the busses. Generating unit No. 1 was completely overhauled, including the hydraulic turbine and the electrical generator.

This work consisted of the removal of the rotor and miscellaneous parts, the cleaning and painting of the stator and rotor coils, and repairs to worn mechanical parts.

Four new 46 kv. oil circuit breakers were installed at the Madden hydroelectric station, replacing other oil circuit breakers which were found to be unsatisfactory for the service required at this station. The breakers that were removed were reinstalled for indoor service at the Miraflores substation, where they will operate under more favorable conditions.

In Miraflores, Balboa, and Critsobal substations protective gaps were installed on the main 46 kv. transformers, and choke coils were removed and 46 kv. floor bushings were modified to afford better surge protection. Deteriorated current transformers on outgoing 2,300-volt feeders were replaced in Miraflores and Balboa substations.

Sixty-one transmission line towers, south of Gatun, were cleaned and painted during the year. The program of removing brackets and having them overhauled in mechanical division shops for reinstallation on towers was continued throughout the year. Reconditioned cantilever brackets have been replaced on all strain towers in the sections between Gatun and Gamboa, and between Summit and Paraiso.

The tariff reduction made in the previous year to consumers using over 100,000 kilowatt-hours per month has now been in effect for over one full year. During the past fiscal year these users had a combined saving of \$98,973 in their electric power bill, of which \$68,453 was saved by the operating divisions of the Panama Canal and the Panama Railroad Co., and the remaining \$30,520 by the United States Army and Navy.

WATER SUPPLY

The inflow of water during the past 2 years from all portions of the Gatun Lake drainage basin as well as the utilization and losses of this water are summarized in the table below. Each year covers the 12 months ended June 30, and thus embraces the cycle of both a dry and rainy season.

	Billion cubic feet, fiscal year		Percent of total yield, fiscal year	
	1939	1938	1939	1938
Yield from Madden Lake drainage basin.....	92.65	104.94	37.3	35.9
Yield from land area downstream from Madden Dam.....	115.94	139.59	46.6	47.7
Direct rainfall on Gatun Lake surface.....	40.12	47.89	16.1	16.4
Total yield.....	248.71	292.42	100.0	100.0
Evaporation from lake surfaces.....	22.19	21.87	8.9	7.5
Gatun Lake lockages.....	45.58	41.44	18.3	14.2
Gatun hydroelectric power.....	28.93	31.11	11.6	10.6
Gatun spillway waste.....	159.12	194.41	64.0	66.5
Storage, increase or decrease (—).....	—8.99	1.97	—3.6	.6
Leakage and municipal.....	1.88	1.62	.8	.6
Total yield.....	248.71	292.42	100.0	100.0

The 1939 total yield of 248.71 billion cubic feet represents an average inflow of 7,887 cubic feet per second, which is 17 percent above the 25-year annual average of 6,747 cubic feet per second. Operation of the Gatun spillway during the fiscal year 1939 totaled 3,946 gate-hours and of the Miraflores spillway, 588 gate-hours.

DRY SEASON—1939

From a Panama Canal water supply standpoint, the 1939 dry season began December 28, 1938, and ended June 13, 1939, with a duration of 168 days. While the dry-season period was unusually long and drier than the average, comparatively high run-off occurred near the beginning and again near the end of the period; accordingly the necessary draft on water storage in Madden and Gatun Lakes for lockages and generation of power was not as great as had been required in several other dry seasons in recent years. The total yield of the Gatun Lake drainage basin during the dry-season period averaged 1,823 cubic feet per second. Evaporation from Madden and Gatun Lake surfaces amounted to 881 cubic feet per second, leaving a net yield of 942 cubic feet per second available for useful purposes. The net yield provided 41 percent of the Panama Canal water requirements for the dry-season period. Necessary draft on reserve storage in Madden and Gatun Lakes amounted to 20.47 billion cubic feet and lowered lake levels to minimum elevations of 206.50 feet on June 5 for Madden Lake and 84.44 feet on June 13 for Gatun Lake.

FLOODS

There were no unusual floods during the calendar year 1938. December was the month of greatest run-off, and the largest flood of the year occurred on December 16, 1938, with a maximum 24-hour inflow into Madden Lake of 40,500 cubic feet per second.

MADDEN LAKE

During the fiscal year 1939 Madden Lake varied in elevation from the maximum of 243.85 feet on January 18 to the dry-season minimum of 206.50 feet on June 5. Free flow over Madden Dam with the drum gates at sill elevation of 232 feet continued from the beginning of the fiscal year to December 5. The lake was then raised to an approximate elevation of 240 feet at the end of the rainy season, and after the beginning of the dry season it was raised still farther to its maximum for the year of 243.85 feet on January 18. The elevation was then lowered to approximately 229 feet on February 10. Further spilling for maintenance of Gatun Lake level and power use lowered Madden Lake to its dry-season minimum on June 5. With the beginning of the rainy season Madden Lake was again allowed to rise, attaining an elevation of 215.37 feet at the end of the fiscal year.

The maximum spilling at Madden Dam during the year was 37,060 cubic feet per second on December 16. Observations on possible seepage through the ridges adjacent to the dam, and observations on uplift pressure and gallery drain seepage in the dam were continued throughout the year.

MADDEN DAM

Extensive tests pertaining to uplift pressure were carried on at Madden Dam for the greater part of the year and a number of observations were made in connection with these studies.

Madden Lake was lowered from elevation 243.85 feet to about 237 feet to allow time for studying the uplift situation. Other tests and inspections were carried on during the year on temperature of concrete, erosion below spillway and needle valves, seepage and leaks in dam, chemical analyses of Madden Lake water and of weirpool water, and deflection and settlement of the dam.

MAINTENANCE OF CHANNEL

Dredges were at work throughout the year dredging and maintaining the Canal channel and terminal harbors from deep water of the Atlantic entrance to deep water in the Pacific. In addition, work on the various authorized special maintenance projects was continued. Excavation during the year is summarized in the following tables:

Location	Maintenance		
	Earth	Rock	Total
<i>Canal prism dredging</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>
Atlantic entrance.....	101,900	2,000	103,900
Gatun Lake:			
Ordinary channel maintenance.....	604,300	17,700	1,622,000
Project No. 14.....	301,100	382,900	684,000
Gaillard Cut:			
Maintenance, including slides.....	924,600	955,150	1,879,750
Project No. 13.....	91,100	227,800	318,900
Project No. 15.....	72,450	94,300	166,750
Pacific entrance.....	1,200	0	1,200
Total Canal prism.....	2,096,650	1,679,850	3,776,500
<i>Auxiliary dredging</i>			
Cristobal Outer Harbor: Project No. 11-A.....	37,400	299,200	336,600
Cristobal Inner Harbor:			
Ordinary maintenance.....	361,000	0	361,000
Project No. 10.....	924,200	21,300	945,500
Coco Solo submarine base.....	83,100	100,200	183,300
Chagres River gravel service:			
Run-of-bank gravel.....	200,450	0	200,450
Stripping gravel beds.....	403,900	0	403,900
Total auxiliary dredging.....	2,010,050	420,700	2,430,750
Grand total, fiscal year 1939.....	4,106,700	2,100,550	6,207,250
Grand total, fiscal year 1938.....	6,633,500	2,001,200	8,634,700

¹ Does not include 79,850 cubic yards of rehandled and overcast material.

² In addition, 24,850 cubic yards of Chainé sand produced by the crane boat *Atlas*.

Dredging operations are divided into three major districts: the northern district, from contour 42 feet below mean sea level in the Atlantic Ocean to Gamboa; the central district, Gaillard Cut, from Gamboa to Pedro Miguel locks; the southern district, from Pedro Miguel locks to contour 50 feet below mean seal level in the Pacific Ocean. Excavation in these three districts is summarized as follows:

	Northern	Central	Southern	Total
<i>Canal prism:</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>
Earth.....	1,007,300	1,088,150	1,200	2,096,650
Rock.....	402,600	1,277,250	0	1,679,850
Total.....	¹ 1,409,900	2,365,400	1,200	3,776,500
<i>Auxiliary:</i>				
Earth.....	1,405,700	0	0	1,405,700
Rock.....	420,700	0	0	420,700
Total.....	1,826,400	0	0	1,826,400
<i>Total:</i>				
Earth.....	2,413,000	1,088,150	1,200	3,502,350
Rock.....	823,300	1,277,250	0	2,100,550
<i>Grand total:</i>				
Fiscal year 1939.....	3,236,300	2,365,400	1,200	² 5,602,900
Fiscal year 1938.....	395,000	1,942,600	6,297,100	8,634,700

¹ 79,850 cubic yards of rehandled and overcast material not included.

² Does not include Chagres River gravel or Chainé sand service.

ORDINARY CHANNEL MAINTENANCE

Northern district (Atlantic entrance, Cristobal Harbor, and Gatun Lake).—Maintenance dredging in the Atlantic entrance was performed by the dipper dredge *Cascadas*, the suction dredge *Las Cruces*, and the crane boat *Atlas*, working an aggregate total of 46 dredging days. The total amount of material excavated was 103,900 cubic yards. Maintenance dredging in Cristobal harbor consisted of operation of the suction dredge *Las Cruces* which worked 17 days, excavating a total of 361,000 cubic yards of material. Maintenance dredging in Gatun Lake was performed by the dipper dredge *Gamboia* and the suction dredge *Las Cruces*, working an aggregate of 74 dredging days. The total amount of material excavated was 701,850 cubic yards. This work included the deepening of the area to be used as an anchorage for the retired Panama Railroad ships *Ancon* and *Cristobal*.

Central district (Gaillard Cut).—Maintenance dredging in Gaillard Cut, exclusive of slide excavation, amounted to 931,850 cubic yards of earth, with three dipper dredges and a suction dredge working a total of 146½ days.

Southern district (Pacific entrance, Balboa harbor, and Miraflores Lake).—Maintenance dredging in the Pacific entrance was performed by the crane boat *Atlas* which operated with a clamshell bucket for 8 days in the East Ferry Slip, excavating a total of 1,200 cubic yards of material. There was no maintenance work performed in the Balboa harbor and Miraflores Lake during the year.

SPECIAL MAINTENANCE PROJECTS

Project No. 1.—There was no dredging on project No. 1, Pacific entrance, or project No. 1, Balboa harbor, during the year.

Project No. 10.—This project calls for dredging the south flare approach to Cristobal inner harbor to -41.0 feet mean sea level which is the ruling grade of the Cristobal inner harbor approach and Canal channel. The purpose of this improvement project is to eliminate the sharp turn for vessels leaving the Cristobal docks south-bound or those docking at Cristobal on north-bound transits. The suction dredge *Las Cruces* worked 53 days on this project, removing a total of 945,500 cubic yards of material. This project was inaugurated on September 17, 1938, and completed on November 29, 1938, following which a hydrographic survey and chart were made of the area dredged. After relocating the channel buoys marking the new prism line the project was opened to shipping.

Project No. 11.—This project, which consists of removing various shoal areas in the outer portions of Cristobal harbor, as described in detail in the annual report of 1935, was started in September 1934. The total excavation for the past fiscal year was 336,300 cubic yards. The total excavation to date on this project is 984,750 cubic yards, of

which 257,000 cubic yards are anticipated fill. The Washington shoals portion of this project was completed this year, following which the area was dragged and a hydrographic survey taken prior to its being opened for shipping. There remains yet to be performed on this project the removal of three shoals in West Limon Bay, designated as project No. 11-B.

Project No. 13, Gaillard Cut.—This project, which consists of widening Culebra Reach by 200 feet to the westward, as described in detail in the annual report of 1935, was started in January 1935. The total excavation for the past fiscal year was 318,900 cubic yards, removed by the three dipper dredges, of which 274,400 cubic yards were material which had been sluiced into the Canal prism; of this amount 171,100 cubic yards were mined rock. The total excavation to date on this project is 1,994,150 cubic yards, and the excavation on this project was 25.4 percent completed at the close of the past fiscal year.

Project No. 14.—This project involves a combined mooring and beaching development directly across the Canal from the Gamboa Dredging Division Station. The fact that the planned beaching area encroached somewhat upon the mooring development as contemplated by improvement project No. 3 necessitated a slight widening of the proposed mooring area to the southward. This development will provide a suitable site for the emergency beaching of any ship that may become disabled or damaged during transit of Gaillard Cut. It lies at the north end of Gaillard Cut and has the advantage of the proximity of the Gamboa Dredging Division Station for emergency tug and launch service and shop and storehouse facilities. This project was begun on November 1, 1938, and completed on May 20, 1939, with a total excavation of 684,000 cubic yards of which 248,500 cubic yards were anticipated fill. After the completion of the project a hydrographic survey was made and chart prepared showing the completed hydrography, the location of buoys and range target aids.

Project No. 15.—This project consists of developing the East Culebra slide basin for emergency use as a beaching site for ships that may become disabled in the south reaches of Gaillard Cut. This project was begun on March 1, 1939, and completed on May 29, 1939, with a total excavation of 166,750 cubic yards. After completion a hydrographic survey was made and a chart prepared showing the completed hydrography, and the location of range target aids.

SLIDES

The total excavation from slides in Gaillard Cut during the fiscal year amounted to 947,900 cubic yards. Culebra slide (west) was the only slide of consequence during the year. This slide was in constant movement throughout the year, mostly of a slow continuous character although on six different occasions the movement became pronounced

for short periods. The recorded movements on the various slide reference points showed a decrease in activity of this slide from the previous year. However, practically continuous dredging operations were required throughout the year in this slide. There was no interference with shipping on account of slides during the year.

Details of the excavation from slides during the fiscal year 1939, together with the total material excavated from June 30, 1913, to the end of the past fiscal year, are presented in the following table:

Location	Fiscal year 1939			Total to date		
	Earth	Rock	Total	Earth	Rock	Total
	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>
Hant Obispo slide (east)				6,700	5,500	12,200
Buena Vista slide (west)				7,000	1,500	8,500
Buena Vista slide (east)				12,100	17,550	29,650
Cascadas slide (east)				9,250	49,900	59,150
White House slide (east)	1,500	2,000	3,500	30,250	46,050	76,300
White House slide (west)				21,000	100,550	121,550
Powder House slide (east)				115,250	343,450	458,700
La Pita slide (east)				12,300	96,700	109,000
La Pita slide (west)				4,550	42,900	47,450
Empire slide (east)				40,550	237,950	278,500
Lirio slide (east)				83,850	161,300	245,150
Division Office slide (west)				4,150	19,450	23,600
Lirio slide (west)				570,450	1,987,750	2,558,200
Culebra slide (east)	11,900	10,600	22,500	2,785,250	18,142,750	20,928,000
Culebra slide (west)	205,900	634,700	840,600	2,045,300	11,442,950	13,488,250
Culebra slide extension (east)	23,550	31,750	55,300	445,700	1,007,950	1,453,650
Barge Repair slide (east)				208,750	474,850	683,600
Contractors Hill (north)	1,800	8,500	10,300	15,600	148,100	163,700
Contractors Hill (west)				7,900	31,600	39,500
Cucaracha slide (east)				2,492,950	6,851,400	9,344,350
Cucaracha Signal Station slide (west)	1,100	1,400	2,500	36,600	206,000	242,600
South Cucaracha slide (east)	5,300	7,900	13,200	61,550	131,700	193,250
Cucaracha Village slide (east)				33,400	77,400	110,800
Paraiso slide (east)				1,950	7,250	9,200
Cartagena slide (west)				60,800	255,150	315,950
Total	251,050	696,850	947,900	9,113,150	41,887,650	51,000,800

Numerous small bank breaks and surface movements occurred during the year at various unlisted points throughout Gaillard Cut. Daily inspections and reports were made of all portions of active slide areas fronting the Canal as well as a periodical inspection of the entire surface of all slides. Drainage conditions were investigated and corrected when possible. Monthly observations were taken of reference points on east and west Culebra, east Culebra extension, Cucaracha (east), Cucaracha (south), and Cartagena slides.

SUBSIDIARY DREDGING DIVISION ACTIVITIES

The Chagres River gravel plant at Gamboa shipped 55,399 cubic yards of sand and gravel during the year, leaving a balance on hand of 184,704 cubic yards, as of June 30, 1939. The pipe line suction dredge *Las Cruces* together with necessary auxiliary equipment was engaged a total of 67 days on dredging operations in connection with the gravel production, excavating a total of 200,450 cubic yards of run-of-bank gravel. The crane boat *Atlas* made 16 trips to Chamé,

dredging a total of 24,850 cubic yards of sand; the tug *Gatun* made 10 trips to Chamé towing 9,940 cubic yards of the total. This material was transported in barges to Balboa and delivered alongside dock No. 7 for the supply department.

The Canal and adjacent waters through Gaillard Cut, Miraflores Lake, and Gatun Lake (including all dump areas) were patrolled and the growth of hyacinths kept under control. Log booms at the mouths of the Chagres and Mandingo Rivers were maintained to prevent hyacinths, logs, floating islands, and other obstructions from entering the Canal channel during freshets or spilling at Madden Dam. During the year periodical inspection trips were made in the Chagres, Mandingo, Frijoles, and Azules Rivers, and along the shores of Barro Colorado Island, Pena Blanca, and Gigante Bays, dumps Nos. 1 to 14, and Miraflores and Red Tank Lakes. Weekly inspection trips were also made of the Canal channel between Gamboa and Gatun.

An estimated 494 cords of driftwood were picked up along the banks of the Canal in Gaillard Cut and Gatun Lake, and in Pedro Miguel Lake and the Mandingo River. The trash-handling plant removed approximately 158 cords of driftwood from the Chagres River.

EQUIPMENT

The following dredges and other floating equipment were in operation during the year: Three 15-yard dipper dredges, *Cascadas*, *Gamboa*, and *Paraiso*, were operated a total of 8.5 months, 10.3 months, and 4.2 months, respectively. The 24-inch pipe-line suction dredge *Las Cruces* was operated for 11.8 months during the year. The crane boat *Atlas* was operated for 1.6 months in general maintenance dredging and in addition made 16 trips to Chamé for sand, spending the remainder of the year in miscellaneous operations, 3.9 months of this time being spent in reserve and under repairs. Derrick barge *No. 157* was in service for 2½ days during the year. It was under repairs for 0.6 month and standing by at the Reserve Fleet tie-up station in Gatun Lake or in the Chagres River above the Gamboa bridge for 11.4 months. The hydraulic grader *No. 4* was in service at project No. 13 for 5.7 months, under repairs for 2.2 months, and standing by for 4.1 months. The drill boat *Terrier No. 2* was in service during the year, excepting a total of 1.5 months lost because of boiler-washing operations and minor repairs. Air compressor *No. 29* was in service 11.5 months during the year at project No. 13. Excavator *No. 1* was in service 1.5 months during the year, engaged in dike construction for stock pile of fill material at the United States Navy submarine base, and on excavation for riprapping in the Gamboa industrial area. Excavator *No. 2* was in service 5.1 months during the year, engaged in reclaiming run-of-bank gravel at the Gamboa stock pile, constructing dike and excavating run-off ditch for the new gravel stock pile,

excavation for track extensions and plant installation in connection with the relocation of the gravel-screening plant, excavation incident to regrading of old gravel stock pile site for installation of tracks and drainage system for extended block-casting yard; and in handling of run-of-bank gravel for the casting of concrete blocks for the Atlantic entrance breakwaters. The 250-ton floating cranes *Ajax* and *Hercules* were operated on alternate months except when calls for extra service required the use of both cranes. Three large tugs, *Trinidad*, *Chagres*, and *Gatun*, supplemented by the large tug, *Mariner*, and two small tugs, the *Indio* and the *Siri*, were operated during the year in towing and transportation service, one large tug being out of commission continuously for the purpose of repairs. Nine launches were in service during the year. An average of two launches was continuously out of service for repairs. The Diesel ferryboats *President Roosevelt* and *Presidente Amador* were in service in connection with the operation of the Thatcher Highway ferry service at Balboa for 7.5 months and 4.5 months, respectively, during the year. Oil barge No. 99, constructed in the Mechanical Division shops at Balboa, was delivered and placed in service during the month of August.

FERRY SERVICE

Ferry service across the Pacific entrance of the Canal, connecting La Boca, Balboa, and Panama City on the east bank of the Canal with Thatcher Highway on the west bank, was operated on a continuous 24-hour basis throughout the year. In the following table are shown the more important statistics relative to the operation of the ferry for the past 2 fiscal years:

	1939	1938
Single trips made by the 2 ferries.....	33,017	31,720
Vehicles carried:		
Panama Canal vehicles.....	13,083	11,314
United States Army vehicles.....	36,904	39,428
Commercial trucks.....	41,420	41,786
Commercial passenger cars.....	67,168	62,136
Private cars.....	208,731	193,039
Total vehicles carried.....	367,306	347,703
Total passengers carried.....	1,771,884	1,654,080

MARINE ACTIVITIES

AIDS TO NAVIGATION

A number of improvements and adjustments were made in the lights, buoys, beacons, and other navigational aids maintained for the benefit of vessels operating in the Canal and adjacent waters. In July 1938 the intensity of the light at San Jose Lighthouse in the Pearl Islands was increased from 840 to 1,200 candlepower, with a visibility of 15 miles. The Bona Island Light was removed from Bona Island

proper and relocated on Bald Rock, a barren, uninhabited rock separated from Bona Island by a 150-foot channel. The new light retains the same characteristics as the old. For the benefit of vessels calling at the San Blas Islands, range targets and buoys were established to mark the entrance of the San Blas channel from seaward. Construction work was begun in June 1939 for the reestablishment of range lights and channel markers indicating the approach to the dock at Fort Randolph, Margarita Bay, at the Atlantic entrance.

ACCIDENTS TO SHIPPING

The board of local inspectors investigated and reported on 27 accidents to shipping in Canal Zone waters during the fiscal year 1939, a summary of which follows with a comparison of accidents in the 2 previous years:

Cause of Accident	1939	1938	1937	Cause of Accident	1939	1938	1937
Ship struck lock wall.....	7	5	14	Tug damaged by ship.....		1	
Struck Canal bank.....	2	4	4	Ship damaged by dredge.....		1	
Ship damaged by tug.....	6	4	3	Explosion and fire.....		1	
Struck dock.....	4	3	7	Emergency anchoring.....		1	
Collision.....	2	1		Other causes.....	2		11
Grounded.....	4	1					
Struck wall adjacent to dry-dock gate.....		1		Total.....	27	23	39

SALVAGE AND TOWING

Panama Canal equipment and personnel rendered assistance to disabled and distressed shipping during the year as follows:

Steamship Point Vincente.—The steamship *Point Vincente*, heavily laden with general cargo and a deck load of lumber, went hard aground on the southeast part of Bona Island on March 26, 1939. Salvage operations were begun upon the arrival of the Panama Canal salvage tug *Favorite* and the vessel was refloated at 6:30 p. m. the same day. The vessel was so badly damaged, however, that it was necessary to beach her on soft bottom in six fathoms of water off Chamé. Salvage operations on this vessel were carried on by the U. S. S. *Favorite* until the arrival, 4 days later, of a commercial salvage tug, when the job was turned over to that vessel.

Steamship Kinross.—In response to a call for assistance, the U. S. S. *Favorite* left Gatun on February 12, 1939, proceeding to the position of the steamship *Kinross* which was disabled at sea off the Pacific coast of Costa Rica. A line was placed aboard the disabled vessel and it was towed to Balboa, arriving at midnight, February 16, 1939.

Steamship Henry S. Grove.—The steamship *Henry S. Grove* went ashore on the west bank of the Canal in Balboa harbor on April 3, 1939. With the assistance of the U. S. S. *Favorite*, the stranded vessel was refloated the same day, and, having suffered no damage from the mishap, at once resumed its voyage.

METEOROLOGY—HYDROLOGY—SEISMOLOGY

Precipitation.—Rainfall in the Canal Zone and vicinity for the calendar year 1938 averaged about 20 percent above normal. The average in the Pacific section was 93.60 inches; in the central section, 115.85 inches; and in the Atlantic section, 164.67 inches. Annual totals at rainfall stations ranged from 85.34 inches at Balboa Heights to 178.30 inches at Porto Bello. February was the month of least rainfall and December of greatest rainfall. The maximum rainfall in 24 consecutive hours recorded during the calendar year 1938 was 8.00 inches on April 29 and 30 at the Candelaria station in the Madden Lake drainage basin.

Air Temperature.—The average air temperature for the calendar year 1938 was slightly below normal; at Balboa Heights it was 78.3° F., with monthly means ranging from 77.3° in December to 79.7° in April. The average air temperature at Cristobal was 79.8°, with monthly means ranging from 79.0° in December to 80.7° in April. The means and extremes for the calendar year 1938 are shown in the following table:

Station	Maximum		Minimum		Annual bihourly mean
	°F.	Date	°F.	Date	
Balboa Heights.....	93	Apr. 6	68	Mar. 5	78.3
Madden Dam	93	Apr. 25	62	Mar. 5	76.9
Gatun	91	{ Apr. 5 Sept. 7 }	70	Mar. 6	79.8
Cristobal	91	Oct. 16	72	Mar. 6	79.8

¹ Mean of maximum and minimum temperatures.

The maximum and minimum temperatures of years of record at various stations are given below (records revised to June 30, 1939):

Station	Maximum		Minimum		Annual average	Years of record
	°F.	Date	°F.	Date		
Balboa Heights	97	Apr. 7, 1912	63	Jan. 27, 1910 (Feb. 4, 1924)	78.7	33
Madden Dam	98	Apr. 13, 1920	59	(Jan. 30, 1929)	77.2	28
Gatun	95	{ May 21, 1925 May 4, 1933 }	66	Aug. 7, 1912	80.3	28
Cristobal	95	{ Oct. 18, 1924 May 21, 1925 }	66	Dec. 3, 1909	80.0	31

¹ Mean of maximum and minimum temperatures.

Winds and humidity.—Monthly mean wind velocities on the Pacific coast during the calendar year 1938 ranged from 4.3 miles per hour in November to 10.0 miles per hour in February, with a maximum velocity for a 5-minute period of 30 miles per hour from the north on July 9. Monthly mean wind velocities on the Atlantic coast ranged from 5.6 miles per hour in October to 16.5 miles per hour in February, with a maximum velocity for a 5-minute period of 31 miles per hour from the northwest on October 29. Northwest winds were most frequent on the Pacific coast and north winds on the Atlantic coast. The average atmospheric relative humidity for the calendar year 1938 was 83 percent on the Pacific coast and 82 percent on the Atlantic coast. Monthly mean relative humidity on the Pacific coast ranged from 72 percent in February and March to 89 percent in November. Monthly mean relative humidity on the Atlantic coast ranged from 74 percent in April to 88 percent in June.

Tides.—During the calendar year 1938 the following extreme tidal heights occurred at Balboa, the Pacific terminal of the Canal: Highest high water, 9.6 feet above mean sea level on August 27; lowest low water, 11.2 feet below mean sea level on February 16; and greatest range between consecutive tides, 20.0 feet on January 18. At Cristobal, the Atlantic terminal of the Canal, the following extremes occurred: Highest high water, 1.27 feet above mean sea level on December 8; lowest low water, 0.80 feet below mean sea level on February 23; and greatest range between consecutive tides, 1.89 feet on December 8.

Seismology.—There were 222 seismic disturbances recorded at the Balboa Heights seismological station during the calendar year 1938. Fifty-seven were of comparatively nearby origin with epicenters distant less than 300 miles; 37 were of distant origin; and the remaining 128 made a record so slight and indistinct that no estimate could be made of the epicenters. Five were generally felt in the Canal Zone. One hundred and thirty-two seismic disturbances were recorded during the 6-month period, January to June, 1939. Only one was felt locally. No tremors occurring during the calendar year 1938 or during the first 6 months of 1939 exceeded intensity III. Modified Mercalli Scale, and none caused any damage locally.

SECTION II

BUSINESS OPERATIONS

The business enterprises carried forward by the Panama Canal and by the Panama Railroad Co. embrace a number of activities which, in the United States, would normally be carried on by private initiative. These activities have been developed either to meet the needs and demands of shipping passing through the Canal, or to meet the needs of the organization and its force of employees. The business enterprises include those sections of the Canal and Railroad organizations which are engaged in the supplying of fuel, provisions, ship chandlery, and repairs to vessels; the sale of foods, clothing, and other essentials to Canal and Railroad employees; the handling of cargo and allied operations; and the operation and management of the Panama Railroad and of the steamship line operating between New York and the Isthmus.

The Canal and the Railroad are separate organizations, but the administration of both organizations is vested in the Governor of the Panama Canal, who is also President of the Panama Railroad Company.

PANAMA CANAL BUSINESS OPERATIONS

Business operations of the Panama Canal are conducted separately from operating activities pertaining directly to the transiting of vessels, and government of the Canal Zone. The annual appropriation acts for the Panama Canal authorize the use of moneys arising from the conduct of auxiliary business activities with the proviso that any net profit derived from such business activities be covered annually into the Treasury of the United States.

It is the aim to operate the business activities as a whole on a self-supporting basis and to include as a proper charge against business operations a fixed capital charge (with some minor variations) of 3 percent for interest on the investment. In the accounting of profits to be covered into the Treasury, the amount representing charges for interest on investment is a part of the net profits covered into the Treasury and in effect is a reimbursement to the United States Treasury for interest paid by it to holders of United States bonds. The investment in business activities totaled \$31,868,200.83 at the beginning of the fiscal year, and \$35,061,078.25 at the end (tables 4 and 5, sec. V). The capital charge for the fiscal year 1939 was \$792,293.63 (table 20, sec. V). The profits of \$681,272.48 fell short of this amount by \$111,021.15.

MECHANICAL AND MARINE WORK

The volume of work performed for the Panama Canal, which is the principal item in the mechanical division shops, showed an increase of \$339,823 as compared with the preceding fiscal year. The total volume of work for all interests was \$3,128,068, a decrease of \$27,854 as compared with last year.

The value and class of work done, and the sources of the same, for 1939, as compared with the preceding year, are shown in the following table:

Gross revenue—class and source

	Fiscal year 1939	Percent of total	Fiscal year 1938	Percent of total
Class:				
Marine.....	\$1,548,058	49.5	\$1,876,607	59.5
Railroad.....	135,782	13.9	474,637	15.0
Fabricated stock.....	237,307	7.6	287,752	9.2
Sundries.....	906,921	29.0	516,926	16.3
Total.....	3,128,068	100.0	3,155,922	100.0
Origin:				
Panama Canal.....	1,678,164	53.6	1,398,341	42.4
Panama Railroad.....	458,902	14.7	496,526	15.7
Other United States Departments.....	414,833	13.3	376,888	11.9
Outside interests.....	576,169	18.1	944,157	30.0
Total.....	3,128,068	100.0	3,155,922	100.0

Operating expenses for the fiscal year totaled \$3,100,226, leaving a net revenue from operations of \$27,842.

The marine work listed above includes construction of new vessels for the Canal and overhaul of vessels for the Canal, the United States Navy, and other departments of the United States Government, as well as merchant ship repairs.

DRYDOCKS

During the year 144 drydockings were made at the Balboa and the Cristobal drydocks, further details of which are given in the table below:

Vessels belonging to—	Balboa drydock	Cristobal drydock
Panama Canal Divisions.....	22	3
United States Navy.....	8	23
United States Army.....	3	9
Other Departments of the U. S. Government.....	1	1
Panama Railroad Co.....	0	3
Outside interests.....	41	30
Total.....	75	69

The Balboa drydock was unoccupied only 10 days of the year, while the Cristobal drydock was unoccupied 63 days. Last year the Balboa drydock was unoccupied 2 days and the Cristobal drydock 82 days.

MARINE REPAIR WORK

No repair jobs of consequence or jobs evoking any outstanding engineering methods were performed for commercial shipping during the year. Perhaps the most interesting commercial ship job of the year was that performed on the steamship *Point Vincente* which had run on the rocks of one of the islands in Panama Bay. Heavily laden with a full deck load of lumber, she was pulled off by wrecking tugs and towed to Balboa shops for drydocking and possible repairs. Drydocking the vessel while in a sinking condition presented problems of an unusual and difficult nature. The vessel was found to be so badly damaged that the cost of repair would exceed her sales value. After the usable cargo was salvaged and the valuable equipment removed, the ship was taken beyond the 100-fathom curve and disposed of.

Repairs to commercial vessels consisted principally of urgent voyage repairs to vessels transiting the Canal or to small craft operating between the Canal and nearby ports in South and Central American countries. Drydocking was required for a number of vessels in need of underwater repairs—such as a damaged propeller or a broken tail shaft.

Repairs to vessels of the United States Army were limited to emergency repairs to Army transports and general repairs to Army craft based in local waters. Two United States Navy battleships, the *New Mexico* and the *Mississippi*, were drydocked in succession during the visit of the United States Fleet at the end of April 1939. The drydocking of a United States Navy capital ship at the Isthmus is a rare occurrence, only six such dockings having been made in the past 25 years. For the greater part, repairs to vessels of the United States Navy were limited to ships of the special service squadron and to craft attached to the submarine base at Coco Solo.

Marine repair work performed for foreign governments included the drydocking and general overhaul of various transports, destroyers, cruisers, and gunboats for the French, Colombian, Peruvian, Chilean, British, Canadian, and Soviet Governments.

As facilities were available throughout the year, a number of the units of the dredging and marine divisions of the Panama Canal were drydocked and overhauled.

WORK OTHER THAN MARINE WORK

The usual amount of light and heavy repairs was afforded locomotives of the Panama Railroad Co. In addition, locomotives were overhauled for United States Army and for the marine shops of the mechanical division. Specifications were prepared for the purchase of new locomotives by the Panama Railroad Co. During the year five banana cars were surveyed and scrapped without replacement.

A large number of repair parts were manufactured for use in the Atlantic locks during the 1939 overhaul. This work was begun at an earlier date than usual to afford employment during a temporary slack-work period and also to avoid the expense of importing machinists from the United States to insure completion of the work by the time required. A great deal of millwork, including sashes and doors, was manufactured for use in the construction of new quarters and public buildings in various towns in the Canal Zone. An unusually large amount of mahogany logs was sawed into merchantable lumber for local Panamanian lumber dealers and landowners.

PLANT IMPROVEMENTS

The new rigging loft at the Balboa shops and the new drydock block shed were completed and occupied during the year. A wide rectangular area was paved with a heavy slab of reinforced concrete to provide a site for the construction of tugs and barges.

Several new metal- and wood-working machines had been received or were on order at the close of the fiscal year. Two 30-ton Diesel locomotive cranes were ordered to replace two steam cranes.

ELECTRICAL INSTALLATION AND REPAIR WORK

The principal activities of the electrical division are as follows: The operation and maintenance of the power system; the operation and maintenance of telephone, telegraph, electric-clock, fire-alarm, printing-telegraph, and railway-signal systems; the operation and maintenance of the street-lighting system; and the installation and maintenance of such electrical equipment as is required by other divisions of the Panama Canal or other departments of the Government, and by such commercial and other vessels as may require electrical work performed while transiting the Canal or calling at its terminal ports. Following is a comparison of the various expenditures of the electrical division for the past 2 fiscal years:

Expenditures	1939	1938
Maintenance and operation of power system.....	\$502,040	\$579,975
Construction and maintenance of electric work.....	796,223	482,443
Maintenance and operation of telephones.....	126,481	130,357
Maintenance and operation of railway signals.....	41,219	40,895
Total.....	1,545,963	1,233,670

Further details of the power system may be found on page 33 of this report, and of the telephone system on page 60. The above total of \$1,545,963 is not a correct total of primary expenses as it includes several elements of duplication. As an example, maintenance and repairs on the power system are performed by the electric work unit and hence this direct element of expense is included in the expenses of both the power system and the electric work.

PURCHASES AND INSPECTIONS IN THE UNITED STATES

The principal purchases of supplies for the Panama Canal were made by the Washington office, as heretofore. Branch offices with assistant purchasing agents in charge were continued at New York and San Francisco. The Panama Canal medical section, New York general depot, United States Army, Brooklyn, N. Y., continued, as heretofore, to make purchases of the principal medical and hospital supplies used by the Panama Canal on the Isthmus.

The assistant purchasing agents at New York and San Francisco and the assistant freight-traffic manager at New Orleans of the United Fruit Company have acted as receiving and forwarding agents for material and supplies delivered at and through their respective ports for transshipment to the Isthmus.

The preliminary inspection of materials in the United States covering purchases, the delivery of which is required on the Isthmus (which constitutes the large majority of purchases), and final inspection of materials delivered in the United States are made by the force of inspectors in the field under the supervision of the inspecting engineer of the Panama Canal at Washington, assisted by the officers of the Corps of Engineers, United States Army; the Bureau of Standards; the Bureau of Mines; the Bureau of Chemistry, Department of Agriculture; the Medical Department, United States Army; the Bureau of Construction and Repair; and the Bureau of Engineering, Navy Department.

The volume of purchases made through the Washington office of the Panama Canal is indicated by the summary following:

	Fiscal year, 1939	Fiscal year, 1938	Fiscal year, 1937
Number of purchase orders placed.....	8,582	8,198	19,004
Value of orders placed.....	\$4,543,924	\$4,281,979	\$4,912,582
Aggregate of purchases since 1904 made through Washington office.....	\$242,758,527	\$238,214,603	\$233,932,624
Number of disbursement vouchers prepared.....	11,002	12,128	11,911
Value of above vouchers.....	\$4,061,710	\$5,322,678	\$5,254,771
Number of collection vouchers prepared.....	316	308	318
Value of above vouchers.....	\$164,324	\$281,993	\$238,075
Cash discounts taken.....	\$42,291	\$49,119	\$12,076
Realized from sales of surplus material.....	\$348	\$90	\$123,925

¹ Largest number of orders placed during any fiscal year since 1904, when construction work on the Canal was begun.

STOREHOUSES AND SHIP CHANDLERY

In addition to its main function of requisitioning, storing, and issuing general supplies for the Canal and Railroad (exclusive of the merchandising operation of the commissary division) the Canal Zone storehouses handled ships' chandlery and sales of other supplies to commercial shipping as well as to units of the United States Army and

United States Navy. The following statistics cover the more important operative features of the storehouse during the past 3 years:

	Fiscal year 1939	Fiscal year 1938	Fiscal year 1937
Gross revenues—sales and issues	\$5,360,280	\$5,334,905	\$5,047,417
Cost of material, plus operating expenses	5,361,776	5,264,415	5,575,321
Net revenues	37,513	70,490	72,096
Inventory as of June 30	\$1,642,917	\$4,082,868	\$4,508,566
Scrap and obsolete stock on hand, June 30	\$15,344	\$19,156	\$24,826
Number of steamship sales	1,746	1,773	1,922
Steamship sales value	\$45,786	\$61,213	\$40,904
Scrap metal sold in local market	tons 175	412	342
Scrap metal sold for export	do	6,454	6,026

OBsolete and UNSERVICEABLE PROPERTY AND EQUIPMENT

During the year disposition was made by sale, or by destruction where the items had no money value, of obsolete or unserviceable property and equipment which had an original value of \$692,434. Replacements were made as necessary.

FUEL OIL, DIESEL OIL, GASOLINE, AND KEROSENE

All deliveries of the products listed above to and from tanks for private companies, as well as for the Panama Canal and the United States Navy, are handled through pipe lines and pumping plants of the Panama Canal.

The following table summarizes the operation of the fuel oil handling plants for the past 3 years:

	Fiscal year 1939	Fiscal year 1938	Fiscal year 1937
Fuel and Diesel oil.	<i>Barrels</i>	<i>Barrels</i>	<i>Barrels</i>
Handled at Mount Hope (Atlantic side)	5,179,455	3,754,037	4,688,168
Handled at Balboa (Pacific side)	3,858,500	3,733,629	4,344,593
Total barrels handled	9,037,955	7,487,666	9,033,061
Received by the Panama Canal	168,797	272,034	424,126
Used by the Panama Canal	203,643	214,021	223,625
Sold by the Panama Canal	28,000	37,424	147,801
Miscellaneous transfers on tank farm	38,071	15,237	17,094
Pumped for outside interests	8,599,522	6,948,930	8,220,325
Total barrels handled	9,037,955	7,487,666	9,033,061
Number of ships discharging or receiving fuel or Diesel oil:			
Panama Canal craft	109	141	90
All others	2,063	1,903	1,929
Total	2,172	2,044	2,019
Gasoline and kerosene:			
Bulk gasoline received	gallons 3,736,203	3,927,821	3,394,833
Bulk kerosene received	do 1,130,617	1,491,106	606,895
Financial results of operations.			
Total revenues	\$617,173	\$621,614	\$757,567
Total expenditures (including cost of sales)	511,376	593,305	627,716
Net revenues	105,797	28,309	129,851

BUILDING CONSTRUCTION AND MAINTENANCE

The principal projects of building construction work completed by the constructing quartermaster's division during the past year were as follows:

Cristobal.—Erection of customs booth and playshed; erection of utility building for the Colon Hospital.

Gatun.—Erection of 10 buildings for family quarters.

Gamboa.—Erection of playshed and grandstand for silver population; erection of shops for municipal engineering division and superstructure for launch dock.

Pedro Miguel.—Erection of police substation and garage building.

Ancon-Balboa.—Erection of school shop building, gymnasium, office for special engineering division; plant for municipal engineering division, post office, police substation, 16 buildings for family quarters, and 3 garage buildings.

All others.—Erection of a mortuary chapel in Corozal; erection of ward 21 and superintendent's quarters in Palo Seco; erection of silver bachelor quarters in La Boca; erection of lodge hall in Red Tank; and erection of lumber shed in Mount Hope.

In addition to the new construction, maintenance and repair work during the past year aggregated \$777,779 of which \$318,692 was expended on maintenance of quarters for gold employees, and \$117,615 on maintenance of quarters for silver employees, the balance of \$341,472 having been expended on all other maintenance work performed by the constructing quartermaster's division.

The total volume of construction and maintenance work for the past 3 years is summarized as follows:

	Fiscal year 1939	Fiscal year 1938	Fiscal year 1937
For Canal Divisions:			
Repair and maintenance work	\$649,630	\$665,604	\$512,537
Construction work	1,463,052	1,381,667	1,530,809
For the Panama Railroad Co.:			
Repair and maintenance work	\$3,229	41,930	46,537
Construction work	5,540	46,643	173,170
For other departments of the Government, employees and others	64,921	58,056	74,015
Total	2,246,372	2,193,900	2,337,068
Total maintenance	777,779	765,590	\$33,089
Total construction	1,468,593	1,428,310	1,703,979
Total	2,246,372	2,193,900	2,337,068

QUARTERS FOR EMPLOYEES

Gold employees.—No changes were made in the general regulations governing the assignment and rental of quarters to American employees. While 49 new family apartments were constructed during the

year, a material increase occurred in the force of American employees, so that the situation between supply and demand for family quarters is about the same as last year. The appointment in recent years of a considerable number of young Americans as apprentices and learners is gradually increasing the number of applications. On June 30, 1939, there were 62 applications on file for original assignment to gold family quarters, an increase of 6 in comparison with the previous year.

Silver employees.—The operation of silver quarters was continued on the same basis as in previous years. New construction for the year consisted of one 32-room bachelor quarters building at La Boca. The demand for quarters from employees on the silver roll is still far in excess of the supply, there being 1,175 applications on file in all districts as of June 30, 1939. Over 50 percent of the silver employees still reside in the cities of Panama and Colon.

A number of very old frame quarters, both gold and silver, which are no longer worth maintaining were disposed of by sale to the highest bidders, and others have been condemned because of excessive maintenance costs due to deterioration. It is believed that the present scale of rental charges on both gold and silver quarters will be sufficient to cover depreciation as well as all other costs of maintenance and operation when the old frame buildings are replaced by the newer types.

REPLACEMENT OF QUARTERS FOR AMERICAN EMPLOYEES

About 12 years ago cost records indicated that the expense of maintaining the oldest frame quarters for American employees had reached the point where replacement was the most economical procedure. A survey showed some of these old quarters were built by the French Canal Co. and by the Panama Railroad Co. before the United States acquired the Canal Zone in 1904. There were also in use a large number of construction camp type of frame houses built during the first years of American operations and large numbers of similar houses built prior to 1915. Some of these were reerected houses which had been moved from towns that were abandoned upon completion of construction work. It was realized that their replacement would require an extensive construction program over a period of years. The matter was placed before Congress and the first appropriation for replacement of quarters for American employees was made for the fiscal year ended June 30, 1927.

The first types of quarters designed and built for the permanent force were of concrete. On account of the large first cost of concrete buildings, designs were resorted to of concrete column and first-floor beams with wood frame structure above. After experience in the construction and maintenance of various types of houses, and after giving consideration to original cost, upkeep, etc., the wooden struc-

tures supported on concrete beams have been adopted as standard, and are preferred by a majority of the employees.

Quarters constructed in 1939 comprised 49 apartments—20 at Gatun, 13 at Ancon, 15 at Balboa, and 1 at Palo Seco. The contemplated construction program for 1940 for the regular maintenance and operating force consists of 12 family apartments at Gatun, 31 family apartments in Ancon-Balboa, 4 bachelor apartments at Ancon-Balboa, 6 family apartments at Gamboa, and 1 bachelor quarters building at Gamboa.

There remain to be provided in the replacement program during the future years, 337 family apartments and 477 bachelors' apartments or rooms.

The following table shows the number of apartments for American employees' quarters which were to be replaced as of June 30, 1926, the replacements by years up through 1940, and the balance remaining to be replaced after the fiscal year 1940:

Number of apartments for American employees' quarters

Locations	Cristobal, New Colon Branch		Gatun		Gamboa		Pedro Miguel		Ancon-Balboa		Total	
	Family	Bachelor	Family	Bachelor	Family	Bachelor	Family	Bachelor	Family	Bachelor	Family	Bachelor
Total number to be replaced June 30, 1929:	347	276	148	23			135	60	408	401	1,098	1,760
1927	49										49	
1928	80										80	
1929	65								10		75	
1930	46								30	40	46	40
1931	1								70		71	
1932	46								25		71	
1933	10	100							12		22	
1934	1								10		26	
1935			15	32					1		51	23
1936			50		26	24					83	24
1937			57		37	12					37	12
1938					52						52	
1939		16	20		6	4			29		49	16
1940			12						34	64	49	68
Total replacements:												
Family	268	116	4 154	132	2 121	2 40			218	104	761	283
Bachelor												
Remaining to be replaced after 1939:												
Family	79	160					8	20	260	297	337	477
Bachelor												

¹ Includes 9 additional bachelor quarters required at Gatun on account of increase in back force because of 40-hour work.

² The quarters built at Gamboa will replace quarters at Pedro Miguel and in other districts.

³ Reduced from 831 to 760 due to less demand for bachelor quarters.

⁴ Gatun replacement of old apartments has been accomplished. The excess quarters over the number listed in 1929 are used for the increased personnel on account of 40-hour week and increased activities.

MOTOR TRANSPORTATION

The transportation division is charged with the operation and maintenance of all motor and animal transportation furnished to the departments and divisions of the Panama Canal and the Panama Railroad Co. This division is required to operate on a self-sustaining basis primarily to supply transportation at a minimum cost to the Panama Canal and the Panama Railroad Co. Revenues during the past year totaled \$418,743 and expenses \$376,521, which left a net revenue of \$42,222. A considerable amount of heavy hauling in connection with various building and highway construction projects was accomplished during the year.

During the year 54 cars and trucks were purchased, and 45 cars and trucks were retired. At the close of the fiscal year 365 cars and trucks, 3 trailers, and 4 motorcycles were on hand.

PANAMA CANAL PRESS

The operations of the Panama Canal Press were continued under the same policy as heretofore. The printing plant carries stocks of materials, and manufactures such necessary stationery, forms, etc., as are required on the Isthmus in connection with the operation of the Panama Canal and the Panama Railroad. It is also charged with the printing of the official publication, *The Panama Canal Record*. The following statistics outline the operations of this plant during the past 2 years:

	Fiscal year 1939	Fiscal year 1938
Gross revenues.....	\$235, 299	\$228, 718
Total output expense (includes supplies not processed in the printing plant).....	221, 213	220, 598
Net revenue.....	14, 086	8, 120
Inventory on hand, June 30.....	76, 687	80, 498

REVENUES DERIVED FROM THE RENTAL OF LANDS IN THE CANAL ZONE

Rentals on building sites and oil-tank sites in the Canal Zone totaled \$44,390 for the year, as compared with revenues of \$45,814 for the fiscal year 1938. Rentals of agricultural lands in the Canal Zone totaled \$10,668 as compared with \$12,072 for the preceding year. At the close of the fiscal year 1,078 licenses were in effect, covering 2,131½ hectares of agricultural land within the Canal Zone. This is a reduction of 54 in the number of licenses under the previous fiscal year, and a reduction in the area held under licenses of 113 hectares. This reduction is largely the result of the policy adopted in May 1935, providing that as a health measure no more licenses for agri-

cultural lands would be issued and that no sales or transfers of holdings under licenses previously granted would be permitted.

BUSINESS OPERATIONS UNDER THE PANAMA RAILROAD CO.

The Panama Railroad Co. was incorporated in 1849 under the laws of the State of New York for the purpose of building and operating a railroad across the Isthmus. In 1904, before actual construction work on the Panama Canal was started, the United States Government secured control of the capital stock of the Panama Railroad Co., which it now owns or controls completely, and has operated the company since that date through a board of directors.

By Executive order of May 9, 1904, the President of the United States directed that the general policy of the railroad be controlled by the United States, while at the same time carrying on its operations as a common carrier. Since that time the corporation has established and operates various business activities upon the Isthmus incidental to the construction, operation, and maintenance of the Canal. Thus the United States Government is conducting the business activities relating to the Canal enterprise under two distinct organizations: first, the Panama Canal, which is a direct branch of the Government; and second, the Panama Railroad Co., which is a Government-owned corporation. As the activities of the railroad company are covered in detail in its annual report, only the major features of operation as they relate to the Canal administration are covered in this section.

In addition to the operation of the trans-Isthmian railroad, the enterprises of the Panama Railroad Co. include commissaries, which are retail general stores selling primarily to Government employees; cargo-handling activities at the harbor terminals; hotels; coaling plants; a steamship line; telephone system; and certain real estate operations in the Republic of Panama.

The operations of the railroad proper, harbor terminals, coaling plants, stables, and baggage transfer were continued throughout the year under the direction of the general manager of the railroad; the telephone system under the electrical engineer; the commissaries, Hotels Washington and Tivoli, and subsidiary activities under the chief quartermaster; and the real estate operations under the chief, real-estate section.

Business operations on the Isthmus, carried on by the Panama Railroad Co., yielded a profit of \$1,481,847 for the fiscal year 1939, as compared with \$1,183,453 for the previous fiscal year, an increase of \$298,394.

TRANS-ISTHMIAN RAILROAD

This railroad line operates between Colon at the Atlantic terminus and Panama City at the Pacific terminus. In addition to these cities, it serves all activities of the Panama Canal. The gross revenue during the fiscal year 1939 from the operations of the railroad proper (not including subsidiary business activities) amounted to \$1,601,804. Tonnage of revenue freight amounted to 323,233 tons, as compared with 280,205 tons during 1938, an increase of 43,028 tons.

Statistics covering the various features of railroad operations during the past 3 years are presented in the following table:

	1939	1938	1937
Average miles operated, Colon to Panama.....	47.61	47.61	47.61
Gross operating revenue.....	\$1,601,804	\$1,600,748	\$1,609,744
Number of passengers carried:			
First-class.....	159,911	159,574	161,443
Second-class.....	207,348	199,323	194,333
Total.....	367,259	358,897	355,781
Revenue per passenger-train-mile.....	\$3.83	\$3.42	\$3.78
Revenue per freight-train-mile.....	\$12.08	\$12.63	\$11.88
Passenger-train mileage.....	132,324	142,257	133,975
Freight-train mileage.....	71,114	68,524	73,477
Work-train mileage.....	6,043	13,916	15,605
Total train mileage.....	209,481	224,697	223,057
Switch locomotive miles.....	106,134	103,290	93,420

RECEIVING AND FORWARDING AGENCY

This division handles the dock and harbor activities of the Panama Railroad Co. at the two terminals of the Canal. The following statistics summarize operations for the past 3 years:

	1939	1938	1937
Total revenue.....	\$1,936,016	\$1,898,086	\$1,812,959
Cargo handled and transferred.....	<i>Tons</i> 1,580,859	<i>Tons</i> 1,530,287	<i>Tons</i> 1,446,813
Cargo stevedored.....	615,530	617,137	581,533
Total.....	2,196,389	2,147,424	2,028,351
Cargo ships handled.....	4,898	4,601	4,589
Banana schooners handled.....	1,211	1,326	1,203
Agency service furnished vessels.....	89	106	164

COALING PLANTS

Coal sales during the past fiscal year, while substantially below the preceding year's sales, were at the same level as for the fiscal year 1937 which is about 50% above the level of the preceding four years. The

following statistics summarize the operations of the coaling plants at Cristobal and Balboa for the past 3 fiscal years:

	1939	1938	1937
Gross revenues.....	\$557,921	\$767,126	\$552,140
Coal sold.....	<i>Tons</i> 70,487	<i>Tons</i> 103,844	<i>Tons</i> 71,861
Coal purchased.....	49,199	124,884	59,944

TELEPHONES AND TELEGRAPHS

The gross revenue from the operation of telephones, electric clocks, and electric printing telegraph machines amounted to \$248,633.

During the year 1,775 telephones were reconnected or installed, and 1,556 were removed or discontinued, resulting in a net increase of 219 for the year. At the end of the fiscal year there were 3,268 telephones, 51 electric clocks, and 24 automatic printing telegraph typewriters in service. Local and long-distance telephone calls handled through the automatic exchanges averaged 54,403 calls per day in 1939, as compared with 55,024 calls per day in 1938. This results in a daily average of about 17 calls per telephone.

REAL-ESTATE OPERATIONS

Real-estate operations of the Panama Railroad Co. cover property owned by the company in the cities of Panama and Colon and buildings erected by the company in the Canal Zone. At the close of the fiscal year 1939 a total of 1,572 leases and 15 licenses were in effect covering the use of Panama Railroad properties in the cities of Panama and Colon. During the past year, 1867.3 square meters of land in the city of Panama, not needed for business purposes, were sold.

COMMISSARY DIVISION

The primary function of the commissary division of the Panama Railroad Co. is to maintain adequate stocks of food, clothing, and household supplies to meet the needs of Government personnel and of various United States Government departments on the Isthmus. In carrying out this function the division operates retail stores in each of the Canal Zone towns, and also central wholesale warehouses and cold-storage plants. Sales are restricted to agencies and personnel of the United States Government, except that sales of ice, cold-storage, food, and other essentials are made to commercial steamships transiting the Canal or calling at its terminal ports.

Net sales for the year totaled \$8,897,317, as compared with \$8,518,242 for the previous fiscal year. At the close of the year the value of merchandise on hand was \$1,137,050 as compared with \$1,079,298 at the close of the fiscal year 1938. The ratio of sales to inventory indicates a theoretical stock turn-over several times a year. The distribution of sales for the past year as compared with the 2 preceding years was as follows:

	1939	1938	1937
U. S. Government (Army and Navy).....	\$1, 450, 032	\$1, 286, 237	\$1, 053, 630
The Panama Canal.....	539, 953	823, 936	795, 227
The Panama Railroad.....	262, 395	273, 139	307, 811
Individuals and companies.....	353, 048	270, 259	265, 590
Commercial ships.....	307, 342	327, 944	354, 342
Employees.....	6, 221, 731	6, 054, 100	5, 827, 402
Gross sales.....	9, 434, 501	9, 035, 615	8, 604, 002
Less discounts, credits, etc.....	537, 184	517, 373	490, 890
Net sales.....	8, 897, 317	8, 518, 242	8, 113, 112

PURCHASES

Purchases during the year aggregated \$6,557,651, an increase of \$406,901 as compared with the previous year. The following tabulation shows the value of the various classes of materials purchased, as compared with the 2 preceding years:

	1939	1938	1937
Groceries.....	\$1, 893, 472	\$1, 861, 179	\$ 1, 780, 970
Candy and tobacco.....	357, 943	328, 061	330, 148
Housewares.....	365, 359	340, 051	347, 647
Dry goods.....	911, 704	829, 161	776, 306
Shoes.....	248, 127	212, 065	203, 551
Cold storage.....	1, 188, 344	1, 175, 048	1, 020, 563
Raw material.....	490, 288	418, 734	471, 335
Cattle and hogs.....	220, 202	201, 178	189, 174
Milk and cream.....	236, 844	224, 883	185, 853
Dairy products.....	645, 368	560, 390	644, 466
Total.....	6, 557, 651	6, 150, 750	5, 950, 013

HOTELS

The Hotels Tivoli and Washington were operated by the Panama Railroad Co. without change of policy. These hotels are an essential adjunct to the Canal for the purpose of providing suitable accommodations to people having business with the Canal, foreign visitors, American tourists, visiting Government officials, and others.

The gross revenue from hotels was \$308,399 as compared with \$329,584 in 1938, and the number of guest-days was 43,744 as compared with 45,402 in 1938.

MINDI DAIRY

The operation of the Mindi Dairy continued as in previous years. Milk production for the year mounted to a total of 417,947 gallons, as compared to 370,721 gallons in the preceding year, an increase of 47,226 gallons. Fresh milk was supplied to the Army and Navy during the year in addition to the regular Canal Zone trade. Buildings and pastures were maintained in good condition by the dairy operating force.

PANAMA RAILROAD STEAMSHIP LINE

The gross operating revenue for the steamship line for the fiscal year ended June 30, 1939, amounted to \$1,734,694.28, and the gross operating expenses amounted to \$1,821,699.63, resulting in a net deficit from operations of \$87,005.35. The operating deficit compared with the net loss for the fiscal year ended June 30, 1938, of \$168,335.07, shows an increase in the net revenue of \$81,329.72.

For the year ended June 30, 1939, the tonnage carried by the steamship line amounted to 210,728 tons, as compared with 188,014 tons in the previous year.

The steamship line carried freight and passengers for account of the Panama Canal and other departments of the Government of the United States at material reductions from tariff rates, which amounted to the important sum of \$566,779.28. Had regular tariff rates been received by the steamship line for such freight and passenger services performed for the Panama Canal and other Government departments, its income would have been increased by \$566,779.28, and its operations for the year would have resulted in a profit of \$479,773.93.

SECTION III

ADMINISTRATION

DEPARTMENTS

The organization of the Panama Canal on the Isthmus embraces five principal departments, namely, operation and maintenance, supply, accounting, executive, and health. In addition to this, an office of the Panama Canal is maintained in Washington, D. C. The Panama Railroad Co., a Government-owned corporation conducting business enterprises on the Isthmus, is a distinct unit, yet it is closely affiliated with the Canal organization.

OPERATION AND MAINTENANCE

The department of operation and maintenance embraces functions related to the actual use of the Canal as a waterway, including the dredged channel, locks, dams, aids to navigation, and statistics of navigation, accessory activities such as shops and drydocks, vessel inspection, electrical and water supply, sewer systems, roads and streets, hydrographic observations, surveys and estimates, and miscellaneous construction other than the erection of buildings.

SUPPLY

The supply department is charged with the accumulation, storage, and distribution of materials and supplies for the Panama Canal and Railroad; the maintenance and construction of buildings; the assignment of living quarters to employees and care of grounds; the operation of storehouses, fuel-oil plants, an experiment garden, and a printing plant, and the supplying of motor transportation facilities to the various departments and divisions of the Canal and Railroad organizations.

ACCOUNTING

The accounting department is responsible for the correct recording of financial transactions of the Canal and Railroad; the administrative auditing of vouchers covering the receipt and disbursement of funds preliminary to the final audit by the General Accounting Office; cost keeping of the Canal and Railroad; the checking of timekeeping; the preparation of estimates for appropriations and the allotment of appropriations to the various departments and divisions; and the examination of claims.

EXECUTIVE

The executive department embraces the general office business of the Governor and all administrative activities invested by Executive order within the authority of the executive secretary. Under this

department come the administration of police and fire protection, postal service, customs, shipping-commissioner work, estates, schools, general correspondence, and records for the organization of the Canal and Panama Railroad, personnel records and administration, wage adjustments, information and publicity, relations with Panama, and the operation of clubhouses, restaurants, moving-picture theaters, playgrounds, etc.

HEALTH

The health department has jurisdiction over all matters pertaining to sanitation and public health within the Canal Zone and the cities of Panama and Colon, the operation of hospitals and dispensaries, and the enforcement of quarantine regulations.

PANAMA RAILROAD CO.

The operations of the Panama Railroad Co. on the Isthmus are generally related closely to the work of the Canal. As the Governor of the Panama Canal is president of the Panama Railroad Co., the heads of departments of both the Canal and Railroad organizations report to him. The general administration of the composite organization is centered in the executive office, and the accounting work in the accounting department; the Panama Railroad, and the business divisions of the Canal organization are billed for their proper share of the general overhead work.

CHANGES IN ADMINISTRATIVE PERSONNEL

Appointments in official positions during the fiscal year 1939 were as follows:

Lt. Comdr. Worthington S. Bitler, United States Navy, was appointed as assistant to the marine superintendent on July 6, 1938, vice Lt. Harold C. Patton, United States Navy, relieved from duty with the Panama Canal.

Col. Michael A. Dailey, United States Army, was appointed superintendent of Gorgas Hospital on November 21, 1938, vice Col. William Richardson, United States Army, relieved from duty with the Panama Canal.

The position of special assistant to the Governor was established on January 1, 1939, and Mr. E. A. Erbe was appointed to fill the office on that date, the position of administrative assistant to the Governor which Mr. Erbe formerly held being abolished.

The position of director of personnel was established on February 1, 1939, and Mr. Seymour Paul was appointed to fill the office on that date, the position of chief personnel officer which he formerly held being abolished.

Lt. Robert A. Hinners, United States Navy, was appointed as assistant to the Governor on January 24, 1939, and on February 11, 1939, was appointed assistant to the superintendent of the mechanical

division, vice Lt. Commander Dale Quarton, United States Navy, relieved from duty with the Panama Canal.

Capt. Charles Sommers, United States Army, was appointed aeronautical inspector on June 1, 1939, to succeed Capt. Frederic H. Smith, Jr., United States Army, as senior aeronautical inspector, effective July 9, 1939.

Lt. Col. Douglas L. Weart, United States Army, was appointed assistant to the Governor on June 29, 1939, to succeed Lt. Col. Wilhelm D. Styer, United States Army, as assistant engineer of maintenance, effective July 18, 1939.

CHANGES IN ADMINISTRATIVE ORGANIZATION

Division of personnel supervision and management.—In accordance with the provisions contained in Executive Order No. 7916, promulgated by the President on June 24, 1938, calling for the establishment of modern personnel service organization within each department and agency of the Federal Government, the division of personnel administration of the Panama Canal was, on January 27, 1939, redesignated the division of personnel supervision and management.

Bureau of statistics abolished.—Effective April 15, 1939, the bureau of statistics, a unit of the executive department, was abolished and its personnel and duties, except for the keeping of vital statistics, were consolidated with the plans section, a staff agency reporting direct to the engineer of maintenance. The purpose of this consolidation was to centralize into one unit various statistical investigations and the keeping of monthly data concerning certain operating features of the Canal-Railroad organization.

Property and requisition bureau abolished.—The continuation of a major study of the property accounting agencies initiated during the preceding year culminated in the abolishment of the property and requisition bureau of the executive department, effective February 1, 1939, and the decentralization of all property records to the field offices of the respective departments and divisions. The purpose of this change was to facilitate the handling of such records and make for increased efficiency.

EMPLOYEES

The force employed by the Panama Canal and the Panama Railroad Co. is composed of two classes which for local convenience have been designated "gold" and "silver" employees. The terms "gold" employees and "silver" employees originated during the construction period of the Canal from the practice of paying common laborers and other unskilled workers employed in the Tropics in silver coin, while skilled craftsmen and those occupying executive, professional, and similar positions were paid in gold coin, the latter group being recruited largely from the United States. Although all employees are now paid in United States currency, the original terms used to des-

ignite the two classes of employees have been retained for convenience. The terms "gold" and "silver" are applied also to quarters, commissary, clubhouse, and other public facilities.

The gold employees—that is, those carried on the gold pay roll—are, with a few exceptions, American citizens and comprise those employees who are engaged in the skilled trades and in the executive, supervisory, professional, subprofessional, clerical, and other positions where education, training, and special qualifications are required. The force of silver employees is composed almost entirely of natives of the Tropics, a considerable number of whom are Panamanians. The majority of the silver employees, other than Panamanians, are workers who came to the Isthmus from various islands in the West Indies during the early construction period of the Canal or are the children of these former workers. The force of silver employees is composed of laborers, helpers, and semiskilled workers who have acquired some manual dexterity but are not first-class craftsmen in their respective trades.

Panama Canal employees are divided, therefore, into two general classes, one of which comprises United States citizens, and the other principally native tropical labor. These two classes are carried on separate pay rolls and the conditions of employment applicable to each differ materially. The division of labor between the two classes of employees is a matter of long custom in tropical countries and our practice conforms to this general custom.

PERSONNEL ADMINISTRATION

The division of personnel administration of the Panama Canal was renamed the division of personnel supervision and management to conform to the provisions contained in Executive Order No. 7916 promulgated by the President. Other sections of this order provided for the establishment of an in-service training program and for a competitive promotional procedure. Accordingly, it has been necessary to increase the personnel staff of the Panama Canal to provide for the expansion in functions entailed in this program.

During the year special attention was directed to in-service training work. The apprentice-learner regulations issued in May 1936, were combined and brought up-to-date and an occupational description of each craft or occupation for which the apprentice or learner can train was added to give prospective applicants better knowledge of various Canal trades. In connection with the apprentice-learner program 46 young trainees were appointed from July 1938 to June 1939 to various apprenticeship and learnership positions.

Continued progress was made in the development of the files of all local applicants and increased cooperation and coordination were effected with the Washington office in respect to employment procedure and the development of applications for various types of em-

ployment on the Isthmus. As of June 30, 1939, there was on file a total of 1,371 applications for employment on the gold roll of the Panama Canal and Railroad organizations, of which 845 were from the United States, 438 from local civilians, 78 from personnel of the Army, Navy, and Marine Corps, and 10 from South America. There were also 246 applications for transfer from employees holding permanent or temporary positions with the Panama Canal and 116 applications for Canal employment from among the civilian employees of the Army, Navy, and Marine Corps. This made a grand total of 1,733 applications on file as of the end of the year.

GOLD EMPLOYEES

The distribution of the gold personnel on June 7, 1939, and June 1, 1938, is shown in the following tabulation:

	June 7, 1939	June 1, 1938	Increase	Decrease
THE PANAMA CANAL				
Accounting department.....	177	174	3	-----
Dredging division.....	187	184	3	-----
Engineer of maintenance, assistant:				
Electrical division.....	189	176	13	-----
Locks division.....	288	283	5	-----
Municipal division.....	120	105	15	-----
Office engineer.....	62	62	-----	-----
Surveys—Meteorology.....	21	24	-----	3
Executive department:				
Executive offices.....	147	148	-----	1
Bureau of posts.....	80	73	7	-----
Civil affairs and customs.....	16	17	-----	1
Clubs and playgrounds.....	72	63	9	-----
Collector.....	16	15	1	-----
Fire protection.....	48	48	-----	-----
Magistrates courts.....	4	5	-----	1
Paymaster.....	12	12	-----	-----
Police and prisons.....	169	167	2	-----
Schools.....	143	147	-----	4
Fortifications.....	3	3	-----	-----
Health department.....	310	311	-----	1
Marine division.....	196	190	6	-----
Mechanical division.....	447	458	-----	11
Special engineering section.....	42	(1)	42	-----
Supply department:				
Offices, chief quartermaster.....	12	10	2	-----
Constructing quartermaster.....	85	84	1	-----
District quartermasters.....	25	26	-----	1
Experiment garden.....	3	5	-----	2
Fuel oil plant.....	38	36	2	-----
Motorcar repair shop.....	34	28	6	-----
Motor transportation.....	42	29	13	-----
Panama Canal Press.....	11	11	-----	-----
Storehouses.....	53	50	3	-----
Total, the Panama Canal.....	3,052	2,944	133	25
PANAMA R. R. CO.				
General manager:				
Offices.....	46	41	5	-----
Transportation and maintenance.....	64	66	-----	2
Receiving and forwarding agency.....	96	99	-----	3
Supply department:				
Commissaries.....	224	218	6	-----
Dairy farm.....	4	3	1	-----
Hotels.....	15	15	-----	-----
Real estate section.....	10	(2)	10	-----
Total Panama R. R. Co.....	459	442	22	5
Total force.....	3,511	3,386	155	30

¹ Included with office engineer.

² Included with general manager, offices.

Increases may be noted in 19 of the 38 units exclusive of the special engineering section and that of the real-estate section, which had gold forces of 42 and 10, respectively as of June 7, 1939. As noted, the force of the special engineering section in June 1938, which was comparatively small, was carried with the office engineer's organization, while that of the real estate section was formerly carried with "Offices" under the general manager of the Panama Railroad Co.

The increase of 13 employees with the electrical division was caused largely by the employment of apprentices, while the additional force with the municipal engineering division and the motor transportation division was caused by the large amount of construction work recently undertaken.

RECRUITING AND TURN-OVER OF FORCE—GOLD EMPLOYEES

The following table shows additions to the gold force and separations from it in the fiscal year from July 1, 1938, to June 30, 1939. Employments are classified as made in the United States or on the Isthmus, and separations are classified by cause:

Gold force	Operation and maintenance	Executive	Supply	Health	Accounting	Panama Railroad Co.	Total
Employed or reemployed in the United States	117	22	2	46	1	10	228
Employed or reemployed on the Isthmus	138	43	48	24	2	38	313
Total additions	305	65	50	70	3	48	541
Resigned	74	22	4	30	3	23	136
Retired							
Age	14	2	1	3	1	8	32
Disability	8	1	2			1	15
Voluntary	11	4	1			4	20
Total	33	7	3	3		13	59
Discharged							
Expiration of force	8	1	1			2	15
Expiration of temporary employment	50	16	13	28	1	1	149
Cause	2		1			2	5
Request of superior officer	2						2
Confession of impracticability	2						2
Without prejudice (involuntary)							
Decent of marriage		1					1
Total separations	210	53	29	63	8	43	406

NOTE.—The above figures do not include 121 employments made on a part-time basis and 47 terminations of part-time employees. The apparent increase in part-time employees is due to the transfer of approximately 60 civilian roll employees employed on a part-time basis to Panama Canal rolls effective September 1, 1938.

The Panama Canal	Panama Railroad Co.
Additions	Additions
393	48
Separations	Separations
363	43
Net addition	Net additions
130	5

Based on an average aggregate gold force of 3,456 for the year, the 406 separations shown above give a turn-over of 11.74 percent from all causes, as compared with a turn-over rate of 10.93 percent for the fiscal year 1938, which was based upon an average of 3,393 employees. When discharges by reason of expiration of temporary employment

are excluded the turn-over rate was 7.4 percent for the fiscal year 1939, as compared with 8.7 percent for the fiscal year 1938.

The Washington office of the Panama Canal tendered employment, on requisitions above the grade of laborer, to 642 persons, as against 191 the previous year. A total of 266 persons accepted tenders and were appointed, covering 62 classes of positions. This was an increase over those issued for the previous fiscal year when 106 appointments were made. The increase was due mainly to recruiting of employees for the locks overhaul and for special engineering projects. A total of 3,039 persons (2,790 from New York, 99 from New Orleans, 4 from other Atlantic coast ports, 144 from Pacific coast ports, and 2 via air transport service), including new appointees, employees returning from leaves of absence and members of their families, were provided transportation from the United States to the Isthmus. This is an increase of 156 over the previous year.

WAGE ADJUSTMENTS

The Panama Canal Act provides that salaries or compensation for Panama Canal employees fixed thereunder by the President, or by his authority "shall in no instance exceed by more than 25 percent the salary or compensation paid for the same or similar service to persons employed by the Government in continental United States." The policy generally has been to pay to United States citizens employed on the gold roll the full 25-percent differential above pay for similar work in Government employment in the United States, within the limit of appropriations available for salaries and subject to the preservation of coordination within the organization. The 25-percent differential above States' rates of pay is justified by the special disadvantages inherent in the climatic, economic, and social conditions prevailing on the Isthmus.

The prevailing allocation of employees included under the classification coincides for the most part with the initial allocations made in 1928 and 1929 immediately following the passage of the Welch Act. As the duties and responsibilities of positions change from time to time due to reorganization, changes of personnel, creation of new positions, etc., the classification committee met frequently throughout the year to consider and take appropriate action on allocation of new positions and recommendations for regradings as submitted by heads of departments and divisions.

The wage board, consisting of the assistant engineer of maintenance and a representative selected by an organization of employees and approved by the Governor, held two meetings during the year for the consideration of requested wage adjustments made by the signal maintainers and by the railroad locomotive engineers.

The salary board, composed of the heads of the nine major departments and divisions of the Panama Canal and Panama Railroad, held no meetings during the year.

The complaints board, established for the purpose of investigating and reporting on complaints of employees, held no meetings during the year.

SILVER EMPLOYEES

The numbers of employees on the silver roll by departments and divisions, as shown on force reports for June 1939 and June 1938, are given in the following tabulation. These summaries cover the number of employees on the specific days on which the force reports were compiled (the first Wednesday of the month), and are believed to be fairly representative for most of the divisions. In some divisions the number of employees at work may change by several hundred within a short time, according to variations in the demand for hourly rated labor. The summary shows only those at work on June 7, 1939, and June 1, 1938:

	June 7, 1939	June 1, 1938	Increase	Decrease
THE PANAMA CANAL				
Accounting department	2	3		1
Dredging division	384	849	35	
Engineer of maintenance, assistant:				
Electrical division	230	213	17	
Locks division	985	672	13	
Municipal division	1,494	1,058	436	
Office engineer	6	4	2	
Surveys—Meteorology	56	69		13
Executive department:				
Executive offices	41	40	1	
Bureau of posts	20	18	2	
Civil affairs and customs	1	1		
Clubs and playgrounds	323	260	63	
Magistrates' courts	2	2		
Paymaster	2	2		
Police and prisons	46	46		
Schools	119	122		3
Health department	842	850		8
Marine division	902	589	13	
Mechanical division	902	938		36
Special engineering section	28	(1)	28	
Supply department:				
Constructing quartermaster	978	975	3	
District quartermasters	381	353	28	
Experiment garden	29	86		57
Fuel-oil plant	53	53		
Motor-car repair shop	49	49		
Motor transportation	122	121	11	
Panama Canal Press	74	75		1
Storehouses	272	280		17
Total, the Panama Canal	8,253	7,737	652	136
PANAMA RAILROAD COMPANY				
General manager:				
Offices	121	279		158
Transportation and maintenance	139	105	334	
Receiving and forwarding agency	889	834	55	
Supply department:				
Commissaries	1,243	1,184	59	
Dairy farm	113	105	8	
Hotels	185	169	16	
Real-estate section	3 ¹	(1)	3	
Total, Panama Railroad Co	2,993	2,676	475	158
Total force	11,246	10,413	1,127	294

¹ Included with office engineer.

¹ Included with general manager, offices.

Increases may be noted in 17 and decreases in 9 of the units employing silver personnel. The increase in 17 units is exclusive of those shown for the special engineering section and real-estate section whose forces were carried with the office engineer and general manager's office of the Panama Railroad Co., respectively, in 1938. The increase of 436 in the force of the municipal engineering division was caused by the greater amount of construction recently undertaken. With respect to the increase shown for transportation and maintenance and the decrease in offices under the Panama Railroad Co., these changes are partially explained by the fact that the roadmaster's organization in 1939 was carried with transportation and maintenance whereas in 1938 it was carried under "Offices." The actual increase in the two combined—i. e., the difference between 334 and 158, or a net increase of 176—was caused almost entirely by the reballasting program of the railroad. The increase of 63 in the clubs and playgrounds organization was due largely to the opening of two clubhouses and to increased business in the restaurants. The increase of 59 in the commissary division was necessary because of increased business throughout the division, and the increase of 55 in the receiving and forwarding agency reflects the greater amount of cargo passing across the docks.

SILVER WAGES

Wages of employees on the silver roll bear no definite relationship to wages of corresponding classes of workers in the United States. As these employees are for the most part natives of the Tropics, their wage scales are established at levels based on wages prevailing for tropical labor in the Caribbean area.

SILVER ELIGIBILITY AND EMPLOYMENT PROGRAM

During the year 2,251 applicants for employment on the silver roll were interviewed and given physical examinations, an increase of 45 percent over last year, while many others showing less evidence of fitness were briefly interviewed and rejected without further examination. Of the 2,251 who passed through the various phases of the eligibility procedure, 114 were rejected and 2,137 (an increase of 52 percent over last year) received cards attesting their eligibility. Of these, 1,638 obtained employment (94 percent more than in 1938) and 499 did not obtain employment.

The eligibility work of the past year brought the total number of those interviewed and examined under the procedure since it was inaugurated to 6,111 at the close of the year. Of this number 5,334 were made eligible and 777 were disqualified or lost their eligibility because of physical disability and other causes. Of those made eligible, 4,315 were at some time in employment and 1,796 remained

unemployed during the year. The fact that the percentage of employments among those persons eligible during the past year is greater than the general percentage for all eligibles attests to the fact that the eligibility program has become more effective in meeting the silver employment needs of the service.

In an effort to obtain an increased number of eligibles in the semi-skilled class, cooperation has been effected with craft schools of the Republic of Panama. Many of the young men from these schools have been trained in the mechanical crafts, and trade schools of the Republic are placing more emphasis on developing potential employees for the Panama Canal and Panama Railroad.

In view of new construction contemplated on the Isthmus, a drive has been undertaken to put through the eligibility procedure all available silver artisans and bilingual foremen on the Isthmus who can meet the eligibility requirements. From present indications it is probable that there will be a definite shortage of silver artisans on the Isthmus and consequently a study is in process to arrive at some accurate estimate of the available common labor supply on the Isthmus.

REPATRIATIONS

Under an act approved May 7, 1934, an appropriation of \$150,000 was provided by Congress for the purpose of repatriating unemployed West Indians and their families who have rendered at least 3 years' service with the United States Government or the Panama Railroad Co. on the Isthmus. In addition to steamship transportation, cash allowances of \$25 are given to single men and \$50 to men with families who may, in meritorious cases, receive \$10 for each minor child to cover miscellaneous traveling expenses, etc. These cash allowances, the total of which may not exceed \$100 for any employee, are granted for the purpose of rehabilitation of these ex-employees in their native countries.

During the fiscal year 1939, approximately \$6,962 was expended for the repatriation and rehabilitation of 108 former employees accompanied by 70 members of their families, a total of 178 persons. There is an increasing reluctance on the part of most of these people to accept repatriation due to the increasingly long period that they have resided on the Isthmus, and due to a belief that their children have somewhat greater opportunity for employment here than in the native land of their parents, although the advent of the disability relief program has tended towards the acceptance of repatriation by recipients of cash relief on the basis that living costs are somewhat less in the West Indies than on the Isthmus.

Including those handled in 1939, approximately 1,315 persons have been repatriated since the appropriation became available. These included 677 employees and 638 members of employees' families. Approximately \$51,766 of this fund has been expended at an average expenditure (repatriation plus allowance) of \$45.60 per person repatriated, and an average cost of \$76.46 per employee repatriated.

The Canal will continue to offer the opportunity of repatriation and a sum for rehabilitation in their home country to former employees with at least 3 years' service while the fund lasts. This may relieve slightly the unemployment situation on the Isthmus, but will have relatively little permanent effect under present conditions because of the relatively high birth rate among the tropical inhabitants.

CASH RELIEF FOR DISABLED EMPLOYEES

As explained in last year's annual report, on July 8, 1937, the President approved an act of Congress which authorized cash relief for certain employees of the Panama Canal who were not covered by the provisions of the Canal Zone Retirement Act. During the latter part of the fiscal year 1938, a system was established for carrying out the provisions of this act, but owing to the need for careful investigations and the complex administrative features attending a program of this nature, cash-relief payments, except in one case, were not actually begun until the beginning of the fiscal year 1939. Since that time the cash-relief program has advanced rapidly. Applications for benefits to be derived therefrom were received at an average rate of about 66 per month.

The table below shows the number of applications received, the number of cases in which cash relief was granted, and the disposition of the applications where cash relief was not authorized. The table also shows the gross and net amounts of the pay-roll, separated for convenience into applications from employees of the Panama Canal and those of the Panama Railroad Co.

	Panama Canal	Panama Railroad	Total
Applications received to June 30, 1939, inclusive.....	653	155	808
Applications approved for payment.....	¹ 375-23	¹ 55-6	¹ 430-29
Applicants died before cash relief was approved.....	16	6	22
Applications suspended for various reasons.....	6	7	13
Applications rejected for various reasons.....	27	6	33
Applicants ineligible because of limitations of the act.....	203	61	264
Applications not complete but in various stages of progress.....	26	20	46
Total.....	653	155	808

¹ The smaller numbers following each figure indicate the number of removals from the rolls on account of the death of cash relief recipients.

Total and average costs

	Total	Deaths	Living ¹
Panama Canal applications.....	375	23	352
Total monthly payments as of June 30, 1939.....	\$6,542.00	\$453.50	\$6,088.50
Average payment per case.....	\$17.44	\$19.71	\$17.29
Panama Railroad Co. applications.....	55	6	49
Total monthly payments as of June 30, 1939.....	\$888.50	\$92.50	\$796.00
Average payment per case.....	\$16.15	\$15.41	\$16.24
All applications as of June 30, 1939.....	430	29	401
Total monthly payments as of June 30, 1939.....	\$7,430.50	\$546.00	\$6,884.50
Average payment per case.....	\$17.28	\$18.82	\$17.15

¹ Shows net amount of pay roll after deducting savings on account of deaths.

Expenditures on behalf of the Panama Canal cash-relief program are paid from annual allotments made for that purpose, while those of the Panama Railroad Co. constitute a continuation of the former system of granting disability relief pay to the superannuated employees of that company and are made from Panama Railroads funds. At the beginning of the fiscal year 1939 disability relief payments were being made to 203 former employees of the Panama Railroad Co. Of this number, 18 died or were otherwise separated from the rolls during the fiscal year 1939, leaving a balance of 185 on the rolls at the end of the fiscal year. These are not included in the statistics listed above, which cover only those employees given cash relief under the plan now in effect.

EXPERIMENT GARDENS

The Canal Zone plant introduction gardens and experimental station were established in June 1923. The gardens, which include greenhouses, nurseries, and experimental plantings, embrace approximately 125 acres of land, and are devoted to the propagation and cultivation of a very wide variety of useful and ornamental plants from all parts of the world, primarily for the purpose of determining their adaptability and value under local soil and climatic conditions for general propagation on the Isthmus. The work of the experimental garden is under the supervision and direction of the Governor of the Panama Canal; however, many of the activities are carried on in close cooperation with the United States Department of Agriculture, and the Canal Zone experiment gardens function much the same as would a tropical station of the Agriculture Department. The value of these gardens as a tropical laboratory for development of plants useful in industry of the United States has been definitely established.

In cooperation with the Bureau of Plant Industry, United States Department of Agriculture, a reference collection of sugarcane varieties of the world was established at the gardens in April 1939. Propagating material was sent from the quarantine greenhouse maintained by the Bureau at the Arlington Experiment Farm near Washington, D. C. The collection represents an effort to assemble examples of all ancestral forms of sugarcane, as well as varieties cultivated by natives,

in the areas where sugarcane is assumed to be indigenous. The project has been in progress for nearly 20 years by exchange with other institutions and by first-hand collecting of "original varieties" (i. e., varieties not the product of modern breeding methods) and the accessions number about 500 clones. The collection is for study of botanical relationships of the large number of plants of the genus *Saccharum* and related genera found growing under natural conditions and under primitive conditions of cultivation. The principal purpose of the study is to determine the full range of natural variation with the group as a basis for developing useful new types by hybridization.

Effective March 1, 1939, the operation of the orchid gardens of the Missouri Botanical Garden was transferred to the Panama Canal and is now being operated as a part of the Canal Zone experiment gardens.

One of the outstanding important introductions of the year was that of the IC2 variety of banana which was sent to the gardens from the Department of Agriculture, Trinidad. This variety is reported to be practically immune to the common banana diseases, besides possessing the qualities required of the commercial Gros Michel. Six plants were introduced and they are all growing exceptionally well.

Originally the experiment gardens were supported by rents from agricultural land leases. However, due to a policy of gradually eliminating such leases in the interest of sanitation and health, the income from that source has materially decreased and a small appropriation has been made for the partial support of the gardens since the fiscal year 1934.

CLUBHOUSES AND PLAYGROUNDS

During the construction of the Panama Canal, recreational and welfare activities for Canal employees were conducted by the Y. M. C. A. with the financial support of the United States Government. These activities when carried forward into the permanent organization were placed under the bureau of clubs and playgrounds. Eventually many diversified activities, such as kindergartens, physical education, motion pictures, restaurants, soda fountains, candy and cigar stands, etc., were assigned to the bureau. Due to the expansion in activities, some of which were of a business or commercial character, in January 1936, after a detailed study, the activities of the bureau were subdivided into two units, as follows:

(a) The clubhouse subdivision which operates restaurants, soda fountains, newsstands, candy and cigar counters, moving-picture theaters, billiard and pool rooms, bowling alleys, and swimming pools, and in which the patronage is restricted to Government personnel and their families. This subdivision is self-supporting and no appropriations are required for the activities carried forward.

(b) The playgrounds subdivision, maintained with appropriated funds, which provides facilities for outdoor recreation and promotes and supervises such activities as physical education, playground activities, baseball, basketball, handball, football, tennis, boxing, fencing, archery, athletic meets, pageants, etc.

CLUBHOUSE SUBDIVISION

As private industry is not permitted in the Canal Zone, the Government is under the obligation of operating restaurants, motion-picture theaters, and other activities for which there is a community demand. A considerable number of these activities is under the clubhouse subdivision of the bureau of clubs and playgrounds for the reason that their centralization under one roof greatly facilitates administration and tends toward a lowering of operating costs. The activities in this unit are on a business basis.

During the year a new gold and a new silver clubhouse at Gamboa were opened for business.

Along with the operation of swimming pools the clubhouses furnish instruction in swimming and life saving to the local community. A new swimming pool at Gamboa was opened during the past year.

There were no important changes in the prices or in the general clubhouse managerial policies during the past fiscal year. Restaurant revenues increased by 4.8 percent, sales at the tobacco and merchandise counters increased by 8 percent, and motion-picture revenues decreased by 3 percent, all as compared with the preceding fiscal year.

Several of the buildings which are now used to house the facilities of this bureau are very old wooden structures that have already outlived their economic lives. Some of these originally had been erected in construction towns of the Canal Zone and toward the end of the construction period were dismantled and reerected on their present sites. It was recognized at the time that these facilities were in the nature of a more or less temporary arrangement, but they were satisfactory and their replacement was not advocated because of the more urgent needs of the Canal. Several of these old wooden buildings are now in a badly deteriorated condition and require heavy maintenance expenditures; accordingly, the time is approaching when these buildings will no longer be adequate and when it will be necessary to replace them with permanent structures.

SUBDIVISION OF PLAYGROUNDS

When the United States Government embarked upon the Canal project in 1904, it was necessary to bring many thousands of employees from the United States and from the West Indies to the Isthmus. In the absence of proper recreational facilities in the Canal Zone, or in the cities of Panama and Colon outside the Canal Zone, the Government embarked upon the policy of providing wholesome amusement and recreational facilities in each of the Canal

Zone villages, similar to those provided in the District of Columbia and by many communities in the States, and likewise corresponding with those provided by foreign corporations operating in the Tropics.

Climatic conditions on the Isthmus and the ever-present danger of contracting malaria, dysentery, and other tropical diseases, when recreation is sought outside of the sanitated areas adjacent to the Zone villages, make the matter of providing adequate recreational facilities to Government personnel and their families of considerably greater importance than in communities in the States. In the absence of such facilities many employees undoubtedly would seek diversion and entertainment in unhealthy and undesirable ways and places.

The appropriation for playground activities covers the salaries of physical directors and directresses, kindergarten teachers, and playground attendants, and also provides funds for the maintenance of playgrounds, playsheds, ball diamonds, tennis courts, running tracks, and similar facilities, and for the purchase of playground and physical education equipment. Some of the recreational activities are partially self-supporting, but they cannot be made wholly so without greatly curtailing their scope and thus lessening the benefits now being derived through their extensive use.

The physical instructors and other personnel employed in the playground unit, in cooperation with the division of schools, have charge of the physical education program for all grammar, high-school, and junior-college students in the Canal Zone schools; conduct kindergartens for children of Government employees; and furnish active leadership and guidance to such organizations as the Boy Scouts, Girl Scouts, Sea Scouts, etc.

The recreational facilities provided by the playground subdivision are used extensively, not only by the civilian employees and their families, but also by the United States defense forces stationed on the Isthmus. Practically all facilities are utilized to their capacity during visits of units of the United States Navy. The cost of these physical and recreational facilities is more than repaid in increased efficiency and morale of the organization and in the improved general welfare and health of the entire Canal Zone population. There is ample justification for the continuation of reasonable expenditures, such as have been made in the past.

Three new playsheds were opened during the year—one for gold employees at Gatun, one for gold employees at Gamboa, and one for silver employees at Gamboa. A new playshed, under construction at Cristobal, was nearing completion at the end of the year.

LEGISLATION

The most important legislation relating to the Panama Canal which was enacted by the Seventy-sixth Congress was the act authorizing and providing for the construction of additional facilities, including a

third set of locks, additional approach channels, and other appurtenant works for the purposes of more adequately providing for the defense of the Canal and for increasing its capacity to meet the future needs of interoceanic shipping. In this connection it will be recalled that under authority of Congress studies have been in progress during the past 2 years to investigate the means of increasing the capacity of the Canal. While the legislation providing for the construction of a third set of locks authorizes appropriations up to a maximum of \$277,000,000 no funds had actually been appropriated when Congress adjourned early in August. It is anticipated, however, that an appropriation will be made soon after Congress reconvenes in regular session in January 1940.

The bill to authorize the appointment to the United States Naval Academy of a midshipman to be selected from among the sons of civilians residing in the Canal Zone and sons of civilian employees of the United States residing in the Republic of Panama, which was pending in Congress at the end of the last fiscal year, was enacted and approved on June 8, 1939.

The deficiency appropriation act of May 2, 1939, contained an appropriation of an additional sum of \$155,000 for the construction of the memorial to Gen. George W. Goethals authorized by Congress in the act approved May 23, 1938.

A joint resolution approved March 28, 1939, provided for the participation of the United States in the celebration of the twenty-fifth anniversary of the opening of the Panama Canal and declared August 15, 1939, the date of the anniversary, a holiday in the Canal Zone.

A bill providing special recognition of the services rendered by civilian officers and employees on the Isthmus during the construction of the Canal and who remained in the service of the Panama Canal or Panama Railroad Co. was passed by both Houses of Congress but was vetoed by the President. A somewhat similar bill, applying to those who served for 3 or more years during the construction period but who left the service before becoming eligible to the benefits of the Canal Zone Retirement Act, is still pending in Congress.

The provisions of another bill pending at the end of the year would permit employees to retire at somewhat reduced age limits and to select one of several optional annuities, including a decreased joint and survivorship annuity payable to the employee during his lifetime and to his widow upon his death.

A bill, similar to one passed by the Senate during the preceding Congress, was introduced in both houses and provides for the erection within the Canal Zone of a memorial auditorium to the builders of the Panama Canal and others whose distinguished service merited recognition by the Congress. The bill was passed by the Senate on

March 23, 1939, but had not been reached for consideration by the House at the end of the fiscal year.

An act to amend the Canal Zone Code so as to extend the benefits of the Canal Zone Retirement Act to W. E. Murtagh and Joseph Inniss, was approved on April 12, 1939.

A bill making a number of amendments to the Canal Zone Code relating to the adjustment and payment of claims for damages to vessels in Canal waters and amending the provisions of the code relating to the Canal Zone Postal service, as well as making several amendments to the Criminal Code and Code of Criminal Procedure, was passed by the House on May 24, 1939, but was still pending in the Senate at the close of the fiscal year.

Other general legislation considered by the Congress during the first session of the Seventy-sixth Congress was carefully reviewed and studied for the purpose of determining its effect on the Canal-Railroad organization, and appropriate recommendations were made from time to time when the circumstances indicated the necessity for such action.

CAPITAL ALLOTMENTS, FISCAL YEAR 1940

The appropriation for 1940 carried \$2,171,000 for improvements and betterments, and for replacement of worn-out or excessively deteriorated facilities, as follows:

Quarters for American employees.....	\$500, 000
Investigation and plans for increasing capacity of the Canal in accordance with act of May 1, 1936.....	250, 000
Increasing capacity of Summit substation.....	60, 000
Additional electrical facilities on west side of Canal.....	85, 000
Ward building, Palo Seco.....	28, 100
Road, Tivoli crossing to Calidonia crossing.....	32, 000
Elimination of Agua Clara filter plant.....	120, 000
Motor car repair shop, Cristobal.....	100, 000
Fort Davis cut-off, Bolivar Highway, north section.....	46, 000
Filling area between Panama Railroad tracks and Gaillard Highway, Balboa station to roundhouse.....	36, 000
Paint and carpenter shop, Gatun locks.....	50, 000
Special items.....	863, 900
Total.....	\$2, 171, 000

Quarters for American employees.—A considerable portion of the existing dwellings for American employees and their families consists of frame structures built prior to 1914 in the early days of American occupation, many of which were transferred from construction camps to their present locations in the permanent townsites. All of these frame quarters held over from construction days have become so deteriorated that they are not only below reasonable standards of family shelter, but the expenditure for repairs which are being made from year to year necessary to keep them habitable, is largely an

economic waste. The old quarters are therefore being replaced by a continuous building program over a period of years.

Investigation and plans for increasing the capacity of the Canal.—This project consists of investigating the means of increasing the capacity of the Panama Canal for future needs of interoceanic shipping and preparing designs and approximate estimates of the cost of additional locks and such other structures and facilities as are needed for the purpose, in accordance with act of Congress approved May 1, 1936. Legislation authorizing the construction of additional facilities, including a third set of locks, was enacted by the Seventy-sixth Congress, but no funds had actually been appropriated when Congress adjourned early in August 1939. It is expected, however, that an appropriation will be made when Congress reconvenes in regular session in January 1940.

Increasing capacity of Summit substation.—This project covers the purchase and installation of additional equipment for the substation located at Summit. Increased demand, represented by recent construction, and load increase caused by use of large electrical dredging equipment throughout Gaillard Cut, make necessary an increase in its capacity and reliability.

Additional electrical facilities on west side of Canal.—This project consists of constructing a power line along the west bank of the Canal to supply power for a new relay pump barge which will be placed in service between Miraflores Locks and Palo Seco in 1940.

Ward building, Palo Seco.—This building is to house inmates of the leper colony at Palo Seco. The construction of the building is part of a progressive plan initiated in 1937 for replacing the worn-out buildings at the leper colony.

Road, Tirolí crossing to Calidonia crossing.—This project covers the construction of a new street designed to take heavy traffic off of congested residential streets of the Canal Zone. The new street will also provide direct access to Gaillard Highway and eventually become a part of the trans-Isthmian highway, giving direct communication to the center of Panama City by by-passing all residential streets.

Elimination of Agua Clara filter plant.—At present the water supply for Gatun, Gatun Locks, Fort Davis, and Fort Sherman is provided by a unit consisting of a reservoir, pumping station, filtration plant, and a storage tank. The proposed project covers the abandonment of this plant, with the exception of the storage tank, and furnishing water to Gatun by the installation of $5\frac{1}{2}$ miles of water pipe between existing pump station and filtration plant at Mount Hope to Gatun, and pumping water from Mount Hope to Gatun. Two 750,000-gallon storage tanks will also be constructed, and new pumps installed in the Mount Hope pumping station to supplement pumps already installed in that station. Under the proposed new arrange-

ment a savings of approximately \$20,000 a year is anticipated and, in addition, the thickly populated sections served by the Mount Hope filtration plant and pumping station will be given considerable protection against interruption in water service.

Motor car repair shop, Cristobal.—This repair shop is to be constructed to replace the existing building which was constructed in 1907 and which has deteriorated beyond economical repair.

Fort Davis cut-off, Bolivar Highway, north section.—The proposed cut-off road is a relocation of a portion of the present Bolivar Highway at Fort Davis for the purpose of avoiding routing of Gatun-Cristobal traffic through the Army post of Fort Davis.

Filling area between Panama Railroad tracks and Gaillard Highway, Balboa station to roundhouse.—This fill is to provide an athletic field to take place of the present athletic field, and to replace facilities which had to be abandoned when the junior college building was constructed in 1935.

Paint and carpenter shop, Gatun locks.—The proposed building will house both the carpenter shops and paint shop which are now in separate buildings. The existing carpenter shop is in an undesirable location on account of the necessity of double-handling much of the material and refuse, and also is a fire hazard in the operating tunnel. The present paint shop is a temporary frame building in poor condition.

GENERAL PROGRAM

During each of the past several years the Canal Administration has given considerable study to all phases of Canal activities with a view to developing and carrying forward a well considered building and construction program, with advance planning extending some 10 years in the future. These studies have been carried out in order that the more pressing needs of the Canal project in the way of replacements, betterments, and enlarged facilities will be provided for under a carefully considered plan.

Previous studies made in this connection were reviewed during the past year, and a detailed 10-year advance construction program has been compiled covering improvements and betterments and also replacements of worn-out, obsolete, or excessively deteriorated facilities, for which funded reserves are insufficient. This program, which covers all anticipated requirements of this nature except for increasing the capacity of the Canal, requires an annual appropriation of about \$2,000,000.

The value of adopting and adhering to a definitely planned program of replacements and betterments lies in the fact that it not only facilitates the submission of comprehensive data regarding future needs to the Bureau of the Budget, but also appreciable savings in the purchase of materials, recruiting and employment of personnel fre-

quently result from coordinating the program for replacements and betterments with the regular activities of the Canal organization.

ADDITIONAL NEEDS

As stated above, lists have been prepared of needed additions and replacements over a period of years and approximate estimates have been made of the costs. Obtaining funds for this work is one of the most important problems of the Panama Canal. During the construction of the Canal inexpensive, temporary, wooden structures were built to house the shops and other parts of the construction plant, the employees, and many of the public-utility and governmental functions, and many of these continued to be used in the interest of economy for housing the operating plant and personnel after construction was completed. Because of the destructive effects of the elements and of the insects in this locality, the economical life of such structures is relatively short. The plan is to replace these with structures of longer life, and at the same time increase their capacity where justified, as funds are obtained. The undertaking is so extensive that many of these old structures are being maintained at excessive cost, and this uneconomical procedure will continue and become progressively worse unless funds can be made available for replacements of many of these structures during the next few years. The most economical method of effecting replacements would be to allocate a definite sum to be used for this purpose each year, as this would permit coordinating the replacement program with the regular activities of the Canal organization.

ENGINEERING AND ARCHITECTURAL DESIGN

In anticipation of the construction program for additional facilities required in connection with national defense the design force was increased approximately 25 percent during the year.

Designs, lists of materials, specifications, and estimates were completed on 28 important public, residential, and industrial projects, and corresponding work was started or continued on 43 similar items. In addition to work on items of defense character, activities included design of various minor structures, alterations to existing ones, and map work assigned to the office engineer's section. General office engineering services were performed for the Canal and Railroad, as well as that normally required in connection with locks overhaul.

STAFF AGENCY—PLANS SECTION

The bureau of statistics which functioned as a unit of the executive department for many years was consolidated with the plans section during the past year. This consolidation centralized in one unit two groups of employees whose duties were closely related, and in some respects slightly overlapped.

The work now handled by the enlarged plans section includes the following: Studies of the financial, physical, and operating features of the various Canal and Railroad divisions in collaboration with responsible department heads; compilation of shipping, commodity, and related statistics; preparation of monthly and annual reports to the Secretary of War, and miscellaneous work of a similar character.

PROVIDING FOR THE DEFENSE OF THE CANAL AND INCREASING ITS CAPACITY FOR THE FUTURE NEEDS OF INTEROCEANIC SHIPPING

Under the terms of Public Resolution No. 85, Seventy-fourth Congress (enacted and approved May 1, 1936), the Governor of the Panama Canal was authorized and directed to investigate the means of increasing the capacity of the Panama Canal, to prepare designs, to submit estimates of probable cost of such facilities, and from time to time to submit reports of progress.

By act of Congress (Public, No. 391, 76th Cong.) approved August 11, 1939, legislation was enacted authorizing and providing for the construction of additional facilities in the Canal Zone for the purposes of more adequately providing for the defense of the Panama Canal and for increasing its capacity for the future needs of interoceanic shipping, substantially in accordance with the plans set forth and recommended in the report of the Governor of the Panama Canal, dated February 24, 1939, and published as House Document No. 210, and including such appurtenant structures, works, facilities, and enlargements or improvements of existing channels, structures, works, and facilities as may be deemed necessary at a total cost not to exceed \$277,000,000.

The plans for increasing the capacity of the Canal provide for the construction of an additional system of locks, located some distance from the existing locks at Gatun, Pedro Miguel, and Miraflores and for the construction of the necessary by-pass channels connecting the new locks with the present Canal channel.

The special engineering division of the Panama Canal organization was established to carry forward the work required under Public Resolution No. 85. The work performed during the past year, however, reflects the change made in the proposed time of starting construction operations. A construction program was worked up in detail, including designation of spoil dump areas; availability and method for supplying materials to construction sites; estimates of required work force, by years; availability of camp sites necessary for the construction forces; relocation of the main line of the railroad which now crosses the site of the proposed locks at Gatun; and final general location for the sites of the proposed locks and by-pass channels, as well as final determination of the dimensions of the lock structures. Cost estimates of all these features were prepared.

During the year work also continued in the preparation of topographic maps required for the construction work. In connection with geological investigations, core-drilling programs were laid out and preliminary test borings were made at the sites for Gatun, Pedro Miguel, and Miraflores locks. A geophysical survey by a seismograph expert loaned by the Corps of Engineers was made of the proposed lock sites between February 1, 1939, and March 17, 1939.

The year's operations were characterized by active recruiting of the necessary personnel. By June 30, 1939, 48 employees had been added to the staff, of whom 31 were new employees recruited from the United States and the remainder were transferred from other divisions of the Canal organization.

While Congress adjourned without making any funds available for these increased facilities, it is expected that an appropriation will be made shortly after Congress reconvenes in regular session in January 1940.

VISIT OF PRESIDENT ROOSEVELT

President Franklin Delano Roosevelt made his third visit to the Canal Zone on August 4 and 5 while Chief Executive. He arrived Thursday afternoon, August 4, on the cruiser U. S. S. *Houston*, with the destroyer U. S. S. *McDougal* as convoy. During the afternoon he entertained Governor and Mrs. Clarence S. Ridley, President and Mrs. Juan D. Arosemena of the Republic of Panama, and other guests at tea aboard the *Houston*. Later he received a representative group of 50 old-time employees of the Canal. President Roosevelt and his party disembarked at 10:30 o'clock Friday morning and, accompanied by Governor Ridley and President Arosemena, made an inspection trip west of the Canal, returning via the Pedro Miguel Locks, Fort Clayton, and Corozal. Following a luncheon at the Governor's home on Friday, the party boarded a special train at 2:30 p. m. at Balboa, and upon arrival at Cristobal a tour of inspection was made of the military posts and naval bases and other points of interest on the Atlantic side. The President and his party boarded the *Houston* at Gatun Locks about 5:30 p. m., August 5, and the cruiser and convoy ship cleared the locks immediately after, sailing for Pensacola, Fla.

SECTION IV

GOVERNMENT

The civil government of the Canal Zone is conducted as prescribed in the Panama Canal Act of August 24, 1912, and subsequent acts and Executive orders made applicable to the Canal Zone. Whenever it has been practicable to assign governmental functions to departments in the organization established for the operation and maintenance of the Canal, this has been done. Complete cooperation and greater economy and efficiency are derived from such coordination of functions.

Data on the expense and revenues of various features of the Canal operation and government are shown in the financial and statistical statement in section V of this report.

AREA OF THE CANAL ZONE

The total area of the Canal Zone,¹ with the areas segregated for various purposes, is shown herewith, as of June 30, 1939:

	<i>Square miles</i>
Total area of the Canal Zone.....	552. 80
Land area of the Canal Zone.....	361. 86
Water area of the Canal Zone (inclusive of Madden Lake to +260 foot contour).....	190. 94
Land areas—military and naval reservations (inclusive of revocable-license area):	
Military reservations.....	51. 80
Naval reservations.....	7. 52
	59. 32
Land areas, Canal Zone townsites and areas in active use (exclusive of Army and Navy posts).....	12. 29
Barro Colorado Island.....	5. 71
Forest preserve.....	5. 47
Swamps.....	16. 50
Cattle pastures.....	63. 00
Commercial farms (leases).....	. 57
Usable land.....	199. 00
Total land area as above.....	361. 86

¹ Not inclusive of Paitilla Point or Fort DeLesseps Reservations or other noncontiguous areas.

POPULATION

A house-to-house canvass of the civil population of the Canal Zone, including employees of the Army and members of families of Army and Navy personnel, omitting only commissioned, warrant, and enlisted personnel, was made by the police force during the month of June 1939. A summary is presented as follows:

	Americans			All others			Total
	Men	Women	Children	Men	Women	Children	
Balboa	2,278	2,611	2,102	3,882	2,808	4,739	18,450
Cristobal	517	743	684	2,960	2,204	3,301	10,418
Prisoners	14	0	0	94	2	0	110
Total	2,809	3,354	2,786	6,945	5,014	8,040	28,978

Many employees of the Panama Canal and the Panama Railroad Co. on the Atlantic side live in United States Government quarters in New Cristobal and Colon Beach, which are in the Republic of Panama. Consequently, they are not included in the above tabulation.

The foregoing total indicates a decrease of 85 as compared with the 29,063 population reported in June 1938. Corresponding figures for earlier years are: 1937, 28,707; 1936, 29,190; 1935, 29,636; 1934, 29,964; 1933, 31,839; and 1932, 30,980. Of the 28,978 civil population living in the Canal Zone in June 1939, a total of 7,714 was employed by the Panama Canal and Panama Railroad Co.; of these, 2,787 were Americans and 4,927 were Panamanians and other natives of the tropics. Approximately 700 Americans and approximately 5,000 native employees live outside the Canal Zone.

PUBLIC HEALTH

General health conditions in the Canal Zone and in the two terminal cities of Panama and Colon in the Republic of Panama continued satisfactory throughout the year. There were no epidemics of communicable disease.

Control of the common housefly in the Canal Zone and the cities of Panama and Colon requires unrelenting effort. By reason of daily collection and disposal of all garbage and wastes, and by constant attention to the cleanliness of stables and disposal of manure, the housefly is rarely seen in the sanitized areas. What few appear are believed to have their origin in the stables and manured gardens of suburban areas in the Republic of Panama which are beyond the control of the health department. Gardeners in the cities use only composted manure as fertilizer, and this must be disposed of promptly upon its receipt and not stored in piles. Disposal of garbage by the

fill-and-cover method at the northern end of the Canal, and by burning in an open-grate incinerator at the southern end, has proven both efficient and relatively economical.

VITAL STATISTICS

The morbidity and mortality rates from diseases and injuries, and other vital statistics relating to the population of the Canal Zone and the cities of Panama and Colon, are set forth in detail in the calendar year report of the health department, which is published annually in booklet form. For this reason, most of the tables are omitted from this report, and the data pertaining to vital statistics are limited to a brief résumé of death rates, birth rates, and infant mortality rates.

General death rate.—For the Canal Zone in the calendar year 1938 the death rate from all causes was slightly lower than for the preceding year, but has shown little change since 1934, when it dropped below 7 per 1,000 for the first time. The death rate is artificially low because the older employees retire and leave the Isthmus and because the population includes a large number of young soldiers. For Panama City the rate has altered very little, averaging 13.17 for the past 5 years. Colon has consistently run a slightly higher death rate averaging 14.58 for the same period. Below are shown death rates by yearly periods for the past 5 years:

Death rates per 1,000 of population—all causes

Calendar year	1938	1937	1936	1935	1934
Canal Zone.....	5.79	6.24	5.62	5.89	6.43
Panama City.....	12.36	13.72	14.44	12.61	12.70
Colon.....	16.03	14.53	14.60	12.90	14.83

Birth rate.—In the Canal Zone the birth rate per thousand population is low, as the white population includes a large number of enlisted men in the Army, and the colored population includes a high proportion of employees in the older age group, as only colored employees with more than the average length of service are able to secure assignment to quarters in the Canal Zone. The following table shows the birth rates in the Canal Zone and in the terminal cities of Panama and Colon for the past 5 calendar years:

Live birth rate per 1,000 population

Calendar year	1938	1937	1936	1935	1934
Canal Zone:					
White.....	7.96	7.18	6.25	7.52	7.79
Colored.....	14.48	15.88	16.03	15.10	13.41
Combined.....	10.94	11.20	10.91	11.35	10.80
Panama City.....	34.64	33.73	35.46	30.69	30.41
Colon.....	30.46	31.85	31.50	29.63	29.03

Death rates among children under 1 year of age.—The following table shows the infant mortality rates for the past five years:

Deaths of infants under 1 year of age per 1,000 live births

Calendar year	1938	1937	1936	1935	1934
Canal Zone					
White	5	12	35	32	49
Colored	58	97	63	59	96
Combined	37	68	54	50	60
Panama City	78	95	93	90	112
Colon	99	77	89	76	124

Principal causes of death.—The eight principal causes of death in each of the three groups of the population were as follows:

Number of deaths and annual rate per 1,000 population, calendar year 1938

Cause of death	Canal Zone		Panama City		Colon	
	Number	Rate per 1,000	Number	Rate per 1,000	Number	Rate per 1,000
Organic diseases of the heart	36	0.80	78	0.87	60	1.71
Cancer (various organs)	30	.67	66	.74	32	.91
Pneumonia (broncho and lobar)	22	.49	140	1.56	61	1.83
Diseases of the arteries	18	.40	47	.52	25	.71
Tuberculosis (various organs)	12	.27	221	2.46	96	2.74
Apoplexy	9	.20	36	.40	20	.57
Nephritis (acute and chronic)	9	.20	66	.74	25	.71
Diarrhea and enteritis	1	.02	71	.78	38	1.09

MALARIA

The malarial rate among employees of the Panama Canal and the Panama Railroad in 1938, 10.4 per thousand, was lower than in any previous year of the Canal's history. While the cycles of rise and fall in the malarial rate do not appear to follow each other within fixed and predictable spans of years, it does seem that there are factors, other than those instituted by man, the nature and extent of which we do not know, that markedly influence the rates from year to year, or over longer periods. No employee has died of malaria within the past 6 years, and but six employees have died of malaria in the past 18 years.

The rates for malaria, among employees only, for the past 10 years are shown below:

Calendar year	Rate	Calendar year	Rate
1929	21	1931	16
1930	26	1935	15
1931	19	1936	12
1932	14	1937	12
1933	27	1938	10

HOSPITALS AND DISPENSARIES

The number of patient-days in Panama Canal hospitals for the past 3 calendar years has been as follows:

	1938	1937	1936
Gorgas Hospital.....	172, 263	171, 045	164, 259
Corozal Hospital:			
Insane.....	69, 603	68, 261	69, 477
Cripples and chronic medical and surgical cases.....	42, 318	41, 430	43, 417
Colon Hospital.....	30, 013	33, 016	32, 151
Palo Seco leper colony.....	41, 106	38, 983	38, 664
Total.....	355, 303	352, 735	347, 968

QUARANTINE AND IMMIGRATION

Inspection was made of 6,726 vessels and 761 airplanes, as compared with 6,486 vessels and 644 airplanes during the preceding year, and 65 vessels availed themselves of the "special demand" night boarding service, as compared with 106 last year.

Unsettled social conditions in several parts of the world, which sooner or later usually are reflected in the health of the people, have not as yet affected the sanitation or personnel of ships entering Canal Zone waters; pestilential diseases, present in certain countries to the east, west, north, and south of the Canal, have not been discovered aboard entering vessels during the year.

Yellow fever continues to be endemic in areas on the west coast of Africa, in the east of South America, and in an adjoining country to the south of the Canal. The short incubation period of the disease, 5 days or less, renders it unlikely that yellow fever will be transferred to the Canal Zone by sea-going vessels; airplanes and passengers are carefully inspected to limit the possibilities of transmission; most of the flight personnel have been immunized against yellow fever.

Bubonic plague, in sylvatic form, which exists in the western part of the United States, has little significance with reference to ships entering Canal ports, unless and until dock or ship rats become infected. Bubonic plague in rats and humans has continued in coastal areas of South America; the occurrence of an outbreak of pneumonic plague in Ecuador and the continuance of sporadic cases among humans prompted a visit by the chief quarantine officer to ports on the west coast to study port sanitation and to determine what additional measures, if any, should be taken for the protection of the Canal. No changes in present procedures were recommended.

Asiatic cholera existed in epidemic form in various ports along the coast of Asia during a considerable portion of the year; ships visiting at some of the affected ports regularly visited the Canal. No case or suspected case of cholera was discovered on these vessels.

Typhus fever, present in endemic form in a considerable portion of central Europe, has not been detected or suspected among the numbers of refugees who have entered Canal waters during the year.

While the time distance between world ports has been shortened by modern forms of transportation, there has not been a corresponding general increase in the danger of transmission of pestilential diseases, because there has been a compensating improvement in sanitation of ports of departure, more thorough inspection of outgoing traffic, and more competent medical supervision of personnel during the voyages.

The activities of the quarantine and immigration division during the fiscal year 1939 are summarized in the following table:

	Fiscal year 1939	Fiscal year 1938	Fiscal year 1937
Vessels inspected and passed	6,727	6,486	6,311
Vessels granted pratique by radio.....	321	122	106
Total	7,048	6,608	6,417
Crew passed at quarantine	368,628	368,955	365,442
Crew passed by radio	126,539	29,751	32,694
Passengers passed at quarantine	130,731	148,056	159,470
Passengers passed by radio	3,018	5,817	2,131
Total	629,916	552,579	559,737
Airplanes inspected and passed	761	644	657
Crew of airplanes inspected and passed	3,279	2,752	2,171
Passengers of airplanes inspected and passed	4,643	4,022	4,224
Total	7,922	6,774	6,395
Vessels detained in quarantine			
Crew detained on board ship for quarantine			
Immigration cases admitted to station	1,015	1,183	1,384
Number of detention days	9,039	9,453	13,355
Persons held for investigation and released	640	325	451
Persons deported under immigration laws	1,339	1,017	937
Supplementary inspection of vessels	3,827	3,674	3,807
Vessels fumigated	41	64	69
Hox cars fumigated	266	235	246
Number of "special demand" night boardings	65	106	131

MUNICIPAL ENGINEERING

Municipal work carried on during the year included the construction and maintenance of roads, streets, and sidewalks, the maintenance and operation of water and sewer systems, and miscellaneous construction jobs of various kinds.

TESTING LABORATORY

A well-equipped laboratory was maintained for the making of chemical and bacteriological analyses of water, chemical analyses of different materials, concrete tests, tests for selection of suitable aggregates for concrete, tests to determine the suitability of different materials and supplies for Canal uses, tests to determine the presence or absence of deleterious gases in the holds of ships and oil tanks, soil and permeability tests, etc.

During the fiscal year the testing laboratory carried on a variety of work, making a total of 8,471 tests in connection with 4,695 varied samples. This included 1,906 tests on water and 2,643 tests on concrete for various purposes. Other tests were made on building materials, clay and soil, gas oils, storage batteries, etc., while inspections were made of swimming pools, ships, tanks, etc.

WATER SYSTEM

Consumption of water for municipal uses during the past 3 fiscal years has been as follows:

	1939	1938	1937
	<i>Gallons</i>	<i>Gallons</i>	<i>Gallons</i>
Canal Zone.....	3, 179, 459, 500	3, 519, 332, 000	3, 109, 912, 000
City of Panama.....	1, 761, 706, 000	1, 568, 202, 000	1, 604, 878, 000
City of Colon.....	811, 639, 000	807, 194, 000	887, 277, 000
Sales to vessels.....	177, 628, 840	184, 781, 000	182, 855, 000
Total.....	5, 930, 433, 340	6, 079, 509, 000	5, 784, 922, 000

The following statement shows the quantity of water pumped at each of the pumping stations during the year, the average per month, and the cost of pumping per thousand gallons:

Pumping station	Total gallons pumped during year	Average gallons per month	Average cost per 1,000 gallons for pumping
Gamboa (intake).....	3, 832, 348, 000	319, 362, 000	\$0. 0153
Miraflores (relay).....	674, 286, 000	56, 191, 000	. 0224
Balboa (relay).....	2, 771, 632, 000	230, 969, 000	. 0161
Paraiso (relay).....	112, 628, 000	9, 386, 000	. 0382
Mount Hope (intake).....	1, 789, 645, 000	149, 137, 000	. 0229
Agua Clara (intake).....	378, 541, 000	31, 545, 000	. 0832
Monte Lirio (intake).....	732, 000	61, 000	. 5808
Frijoles (intake).....	4, 335, 000	361, 000	. 4150
Total.....	9, 564, 147, 000	797, 012, 000	-----

Of the above stations those at Paraiso, Miraflores, and Balboa are relay stations. Omitting the water which was repumped from the total listed above, 6,005,601,000 gallons of raw water, an average of more than 16,400,000 gallons a day, were pumped by the municipal water system during the past year. This was done at an average over-all cost of \$0.03287 per thousand gallons as compared to an average cost of \$0.03325 per thousand gallons for the previous year. All pumps are electrically driven, except those at Frijoles and Monte Lirio which are driven by gasoline engines.

The usual maintenance work was performed on the pipe lines, reservoirs, filtration plants, and pumping stations during the year. In addition to regular maintenance, work was performed on a number of special projects.

SEWER SYSTEM

In addition to the regular maintenance work, the sanitary sewer system in the vicinity of the old Cristobal administration building was rebuilt; the Cristobal commissary and fire station sewers were connected to the Cristobal sewer sump; the sewer from Roosevelt Avenue to Balboa Harbor was reconstructed; and the sewer line on Cruces Street, Balboa, was renewed.

ROADS, STREETS, AND SIDEWALKS

In addition to maintenance work performed on the roads, streets, and sidewalks in the Canal Zone, many special projects were carried out during the year. These included: Construction of sidewalks in Old Cristobal, Gatun, and Gamboa; widening of streets in Cristobal, Ancon, Balboa Heights, and Pedro Miguel; extension of roads in cemeteries at Mount Hope and Corozal; removal of slides on Thatcher Highway; construction of parking spaces in Old Cristobal and Pedro Miguel; relocation and reconstruction of culvert on Gaillard Highway, Gamboa; repairs to Gaillard Highway to bring concrete slab up to grade; surveys for the relocation of Gaillard Highway between its junction with the Madden Road and a point about 3 miles south of Gamboa; improvements, replacements, and reconstruction of different sections of Bolivar Highway.

GAMBOA PROJECT

Municipal work was continued at Gamboa until November 1938, which brought to a close the construction program for the new town site. Playground facilities were extended to include a double tennis court, a baseball diamond, and a quarter-mile running track at both the gold and silver playgrounds. Work accomplished during the year included 0.77 mile of sanitary sewer mains and laterals; 0.66 mile of storm sewers; 2.83 miles of open concrete gutters; 0.68 mile of water mains; 0.86 mile of brass pipe for house connections; 12,380 square yards of 6-inch reinforced concrete street paving; 1,100 square yards of 5-inch reinforced concrete street paving; 992 square yards of 4-inch nonreinforced concrete slab for driveways at public buildings; 8,400 square yards of oiled gravel roadway; 3,900 square yards of oiled gravel parking areas; 9,752 linear feet of 6-inch concrete curb; 1,396 linear feet of 6-inch curb and 12-inch concrete gutter; 8,732 square yards of 4-inch nonreinforced concrete slab for street walks; and 25,000 cubic yards of excavation.

CARDENAS RIVER BRIDGE

Due to the inadequate width of the old Cardenas Bridge situated just south of Fort Clayton on Gaillard Highway it was found necessary to construct a new bridge of reinforced concrete slab design of a

total length of 105 feet divided into four spans. The width of the bridge is 27 feet with a 5-foot sidewalk. The work of construction was started in January 1939 and completed in June 1939.

CONSTRUCTION OF CONCRETE RUNWAYS AT ALBROOK FIELD

In December 1938 the municipal engineering division commenced construction on a series of concrete runways at the United States Army's flying field at Balboa (Albrook Field). The runways consisted of one principal runway, known as the north-south runway, which was 4,600 feet long by 250 feet wide; a smaller runway running approximately at right angles to the principal runway, 2,507 feet long by 75 feet wide; and the following taxi strips: One 1,493 feet long by 50 feet wide, one 1,723 feet long by 42 feet wide, and one 449 feet long by 42 feet wide.

The construction of these runways, which consisted of 6½-inch thick reinforced concrete, was carried forward during the dry season. The north-south runway was completed and turned over to the Air Corps on April 11, 1939, and the balance of the work was completed early the following month.

CITIES OF COLON AND PANAMA

Regular maintenance was performed on the water and sewer systems and the streets during the year. In the city of Panama the following major projects were carried out: Sixteenth Street, West, was widened and reconstructed; water lines on Avenue B, North Avenue, and National Avenue were renewed; and water and sewer connections and fire hydrants on Avenue B were relocated and replaced.

In the city of Colon the following major projects were carried out: Drainage was improved in various locations, the water line was renewed on Amador Guerrero Street, and sidewalks were constructed on the north side of Second Street between Melendez Avenue and Coconut Alley.

MISCELLANEOUS PROJECTS

Sosa Hill quarry and rock-crushing plant.—Due to increase in demand for crushed rock during the year, a 16 by 16 rock crusher was purchased and installed. In addition to the crusher, distributing bins and screening plant were erected. The bulk of the rock was sold to the Panama Railroad Co. for reballasting the main line, and to the municipal engineering division for use in concreting the Albrook Field runways.

Rock asphalt plant.—This plant is operated to produce rock asphalt for use in resurfacing and repairing Canal Zone roads and for various other miscellaneous purposes. During the year 1,116 tons of this product were manufactured.

PUBLIC ORDER

During the past fiscal year 3,059 persons were placed under arrest by the Canal Zone police, a decrease of 92 arrests as compared with the previous year, when 3,151 arrests had been made. Statistics covering these arrests, with corresponding arrests for the previous year, are covered in the following table:

	1939	1938
	<i>Persons</i>	<i>Persons</i>
Male	2,888	3,018
Female	171	133
Total	3,059	3,151
Arrests made with warrants	243	236
Arrests made without warrants	2,816	2,915
Total	3,059	3,151
Residents of Canal Zone	916	865
Residents of Panama	1,841	1,913
Transients	302	373
Total	3,059	3,151

There were 3,315 charges filed against persons arrested, of which 93, or approximately 2.8 percent, were felonies. Following were the principal causes of arrests:

Cause of arrest	1939	1938	Cause of arrest	1939	1938
Violation of vehicle traffic regulations	1,657	1,645	Vagrancy	117	125
Litering	321	341	Fugitive from justice	114	117
Violation of immigration regulations	240	255	Battery	128	105
Disturbing the peace	139	139	Disorderly conduct	112	101
Petit larceny	124	131	All others	463	457
			Total	3,315	3,416

The persons arrested included nationals from 67 countries and territories and were of 188 different trades and professions. Arrests for homicide totaled 3 during the year. One was a case of involuntary manslaughter which upon investigation was dismissed without prosecution. The other 2 cases resulted in convictions of second degree murder, and the defendants were sentenced to hard labor in the Canal Zone penitentiary for terms of 21 and 25 years, respectively.

Suicides during the year numbered 9, of which 2 were by drowning, 5 by shooting, 1 by hanging, and 1 by poison. The coroner investigated 57 deaths during the year, of which 12 were due to accidental drowning and 13 to natural causes.

The number of prisoners serving sentences in the common jails at the end of each month averaged 55. All prisoners who were physically able were employed on municipal work, public improvements, janitor,

and miscellaneous work at the police and fire stations, and at target ranges. The total value of such common-jail labor for the year was \$22,389.57.

Forty-three convicts were committed to the Canal Zone Penitentiary during the year, an increase of 17 over the previous year, with aggregate sentences of 113 years and 8 months; 27 were discharged, and none was pardoned during the year. At the close of the year 71 remained in confinement as compared with 55 at the end of the preceding fiscal year. Labor performed by convicts was valued at \$30,150.96 on the basis of standard rates of pay. The convicts were employed on road and municipal improvement work, improvement and maintenance of prison grounds and buildings, manufacturing and repairing of prison clothing, and the cultivation of fruits and vegetables, etc., at the penitentiary farm and at the experiment gardens at Summit. The total value of fruits, vegetables, and other products of the penitentiary farm amounted to \$6,543.71 as compared to \$7,-573.66 for the previous year.

Thirty-one persons were deported from the Canal Zone by the Governor during the year. Of this number 26 were convicts who had completed terms of imprisonment, and 5 were persons who had been convicted of misdemeanor charges or who were deemed undesirable persons to be permitted to remain in the Canal Zone.

Traffic accidents reported in the Canal Zone during the year totaled 441, or an average of 36.75 per month, resulting in the deaths of 7 persons and injuries to 178 persons, of whom 48 were pedestrians.

Following is a classification of the causes of these accidents for the past 2 years.

Cause	1939	1938	Cause	1939	1938
Reckless driving.....	210	207	Defective vehicles.....	15	9
Negligent driving.....	149	122	All other.....	14	21
Careless pedestrians.....	23	27			
Inexperienced driver.....	16	27	Total.....	441	434
Intoxicated driver.....	14	21			

Detectives effected 169 arrests, and in addition made 696 investigations during the year. The usual routine work was carried on by the criminal identification bureau in cooperation with the Army and Navy and with other law-enforcement organizations and immigration authorities.

During the year two new buildings were completed and occupied: the police substation in Ancon and the police substation in Pedro Miguel.

FIRE PROTECTION

During the year 92 fires, 18 false alarms, and 2 emergency calls were reported. The following table lists the owners on whose property these fires occurred and the extent of losses suffered, together with a comparison with the fires occurring in the previous year:

	1939		1938	
	Number of fires	Property loss	Number of fires	Property loss
Panama Canal	61	\$4,625	67	\$514
Panama Railroad Co	4	4	11	5
U. S. Army	3	200	7	700
U. S. Navy	1	600	1	0
Private	23	1,907	25	\$0,073
Total	92	7,336	111	\$1,892
Total value of property involved	\$818,879		\$3,611,155	

The biggest fire loss during the past year occurred at the Miraflores Diesel electric plant. This plant was struck by lightning on June 2, 1939, which burned out the stator coils on the condenser resulting in a property loss estimated at \$2,500. There was no actual damage from fire in this incident.

MAGISTRATES' COURTS

BALBOA

In the magistrate's court for the subdivision of Balboa, 18 civil and 1,859 criminal cases were disposed of, whereas a total of 1,967 cases had been disposed of during the previous year. In the criminal cases 1,575 resulted in conviction, 149 in acquittal, 70 were dismissed, and 65 were held for the district court. Imposition or execution of sentence was suspended in 156 cases and the defendants were placed on probation. Of this group 8 were rearrested for violating the terms of probation and were returned to serve the sentence originally imposed.

CRISTOBAL

In the magistrate's court for the subdivision of Cristobal, 10 civil and 1,046 criminal cases were disposed of during the year, whereas 1,091 cases had been disposed of in the previous year. In the criminal cases 938 resulted in conviction, 41 in acquittal, 22 were dismissed, and 45 were held to the district court. Imposition or execution of sentence was suspended in 59 cases and the defendants were placed on probation. Of this group 6 were rearrested for violating the terms of probation and were returned to serve the sentence originally imposed.

PARDONS AND REPRIEVES

The pardon board, consisting of 5 members, acts under appointment of the Governor and in a purely advisory capacity. No changes in the personnel of the board were made during the year. During the year 17 applications for executive clemency were referred to the board. The exercise of executive clemency was recommended in 3 of these cases; another case in which clemency was recommended was pending at the end of the year.

PUBLIC SCHOOL SYSTEM

Except for the fact that in the Canal Zone the schools are situated in the various towns rather than in sections of a city, the school organization is comparable with the usual city-school system in the United States, having a superintendent with assistants in general charge and a principal for each school.

It has been the practice for a number of years to make comparisons of enrollment from one year to the next on the basis of the number attending school at the end of February, as February is usually the peak month. The total number of regular pupils enrolled in February of the past fiscal year, in both white and colored schools, was 6,128 which is a decrease of 32, or 0.5 percent, since February 1938. In the white schools the regular enrollment increased from 3,061 to 3,103, an increase of 42, or 1.4 percent, over the preceding year. In the colored schools enrollment dropped from 3,099 to 3,025, a decrease of 74 or 2.4 percent. Free-school privileges are granted to children of silver employees of the Panama Canal and the Panama Railroad Co. only when such employees reside on the Canal Zone. Colored-school enrollment has shown a steady decline since 1932, the peak year, when the number enrolled in February was 4,149.

For the past 5 years average daily attendance has been as follows:

	1939	1938	1937	1936	1935
White schools.....	2,686	2,765	2,755	2,717	2,797
Colored schools.....	2,818	2,881	3,091	3,186	3,406
Total.....	5,504	5,646	5,846	5,903	6,203

The above does not include the enrollment in the Canal Zone junior college, which is covered in the following paragraphs.

The enrollment of 141 pupils in the junior college was the highest it has been for any year since the opening of the Canal Zone junior college in the fiscal year 1934. The junior college prepares its graduates for admission to the junior class of the college or university of

their choice. Its standard of work has been such that the students have experienced little or no difficulty in transferring to the leading colleges or universities in the United States. The Canal Zone junior college provides certain terminal courses, especially in the fields of engineering and commercial work, for students who desire to complete their formal education with the 2 years of work beyond high school and who will seek employment after completing the work in the junior college. The commercial department is providing a terminal course with a view to preparing students for work immediately after graduation. Equipment is now available to provide practical laboratory work in terminal courses in mechanical and electrical engineering. These courses are especially designed to prepare young men for apprenticeships in skilled trades in the Panama Canal or Panama Railroad organizations.

The junior-college extension courses had an enrollment of 283 students, an increase of 102 over the preceding year. The large enrollment in these classes is an indication of the interest shown by the community in the educational opportunities provided by the junior college.

Standard Stanford achievement tests are administered to all students at least once each year. The results secured not only provide information necessary to properly classify students but they furnish fairly accurate evidence of the general quality of instruction in the local schools as compared to that in typical schools of the United States. The test results indicate that medians for pupils in grades 5 to 8 in white schools in the Canal Zone are substantially above medians for pupils in grades 5, 6, 7, and 8 in States' schools, the achievement in these grades in the Canal Zone schools exceeding the average or median States' school by approximately one school grade. In the colored schools achievement during the earlier years is approximately equal to States' school standards, but beginning with the fifth grade the achievement in the colored schools begins to lag behind States' school standards, and at the end of the eighth grade these tests show that for pupils in the colored schools, the achievement is 1.6 years below the standards for the average school in the United States in corresponding subjects. In the high schools the tests show that Canal Zone medians exceeded States' medians in 13 subjects, equaled them in 1 subject, and were below in 4 subjects. The evidence indicates that the Canal Zone schools are as good as the better schools in the United States.

During the year several meetings were held with the teaching staff to study and discuss together professional problems. Character education and the development of the higher mental processes were the two main subjects studied. The course in occupational informa-

tion was greatly expanded this year. In addition to the regular classes the instructor held special conferences with students, parents, and teachers, and conducted small groups of pupils to establishments on the Isthmus where work is done in which members of the group have occupational interest.

A large program of activities outside of the regular classroom is sponsored by the school and student body. These activities consist of dramatics, public speaking and debating, dances, and entertainments of various kinds which are conducted by the students with the guidance and supervision of the faculty. The bands and orchestras of the music department made numerous public appearances during the year, especially at Christmas time and during Music Week.

POSTAL SYSTEM

Fourteen post offices were in operation at the end of the year. These include seven post offices in civilian towns of the Canal Zone, six at the United States Army posts, and one at Coco Solo, a station of the United States Navy. The new Ancon post-office building was completed and occupied during February.

Net receipts of the postal system were \$18,959 for the fiscal year 1939. Operations for the past year are summarized and compared with the preceding fiscal year in the following table:

	1939	1938
Sales of postage stamps, postal cards, stamp books, etc.....	\$289,638	\$269,385
Money order fees.....	20,757	18,701
Box rents collected.....	18,982	17,933
All other receipts.....	19,582	11,024
Total receipts.....	348,959	317,043
Total expenses.....	330,000	317,043
Net surplus.....	18,959	0

The interest rate of 2 percent per annum on deposit money orders remained unchanged during the year. Statistics covering the operation of the deposit and regular money orders are given in the following table:

	1939	1938
Deposit money orders:		
Money orders issued..... number.....	21,422	20,197
Money orders issued..... value.....	\$2,130,325	\$1,819,205
Money orders paid..... number.....	23,222	26,529
Money orders paid..... value.....	\$1,861,730	\$1,828,600
Funds on hand at end of year.....	\$2,070,190	\$1,801,595
Regular money orders:		
Money orders issued..... number.....	196,012	176,584
Money orders issued..... value.....	\$3,507,252	\$3,188,930
Fees collected.....	\$20,757	\$18,701
Money orders paid..... number.....	37,927	37,678
Money orders paid..... value.....	\$589,011	\$577,805

Other statistics relative to the operation of the Canal Zone postal system are presented in the following table:

	1939	1938
Registered and insured articles dispatched		
Official letters and parcels registered free	41,853	40,885
Foreign registered letters	27,585	27,830
Foreign registered parcels	2,977	2,914
Domestic registered letters	18,636	19,066
Domestic registered parcels	37	47
Insured and c. o. d. parcels	5,797	5,891
Total registered and insured articles dispatched	99,883	96,639
Registered and insured articles received		
Registered articles	77,079	71,658
Insured and c. o. d. parcels	35,633	31,165
Foreign parcel post	6,124	4,620
Total registered and insured articles received	118,836	107,443
Dispatches of mail by steamer—Cristobal		
Dispatches made to the United States	349	313
Dispatches made to foreign countries	1,466	1,634
Total dispatches made by steamer	1,815	1,947
Dispatches received from United States	657	711
Dispatches received from foreign countries	2,298	2,338
Total dispatches received by steamer	2,955	3,049
Dispatches of mail by steamer—Balboa:		
Total dispatches made	2,161	2,389
Total dispatches received	2,437	2,582

AIR MAIL

The United States-foreign air-mail schedules were changed during April which resulted in faster service to Miami twice weekly, but much slower service for the third dispatch each week via Barranquilla, Colombia. The planes now operate on a semiweekly 10-hour schedule between Cristobal and Miami, but the third service, via Barranquilla, does not work to any great advantage for mail destined to the United States. In both directions the mail remains in Barranquilla approximately 24 hours waiting for connection to and from the Canal Zone.

The faster service from Miami was reflected in improved service between Cristobal and west coast ports as far south as Lima, Peru. Quito, Ecuador, was made a port of call as a result of the change. The general revisions of schedules also resulted in faster service between Cristobal and Trinidad, the trips now being made in 12 hours compared with 30 hours under the former schedule.

The response of the public to the 25-percent reduction of postage rates to the United States authorized during December 1937 was further reflected by an increase in the sales of air-mail stamps, receipts from the sale of which amounted to \$136,041 in 1939 as compared with \$120,576 in 1938, a gain of 12.75 percent. This increase represents a gain over the preceding year of approximately 40 percent in the volume of air mail handled, and offers additional argument for a 10-cent rate for air-mail letters to the United States.

The number of air-mail dispatches from Cristobal during the year was 6,314, and the number received, 12,459, compared with 5,672 forwarded and 11,793 received during the previous year. Dispatches were made to 60 exchange offices and received from 76, compared with 57 and 65, respectively, during 1938.

IMMIGRATION VISAS

During the fiscal year 57 visas were issued by the executive secretary to alien residents of the Canal Zone traveling to the United States. Of these, 7 were quota visas, 26 were nonquota visas, 23 were non-immigrant visas, and 1 was a transit certificate. Fees collected for visas amounted to \$348.25.

RELATIONS WITH PANAMA

Ratification of Treaty.—The new treaty between the United States and the Republic of Panama which was concluded March 2, 1936, and ratified by Panama the same year, was ratified by the United States and proclaimed on July 27, 1939. This new treaty, while it does not supersede the 1903 treaty, abrogates several of the provisions of that treaty and makes several amendments and additions. Among other things, the new treaty increases the annual payment of \$250,000, which the United States was bound to pay to Panama under the terms of the old treaty, to 430,000 balboas (dollars). It defines the classes of persons entitled to reside within the Canal Zone, as well as those entitled to purchase goods imported into the Canal Zone, or purchased, produced, or manufactured therein by the United States Government. It provides also for restrictions on the establishment of private business in the Canal Zone and for the establishment of Panamanian customs houses at Canal Zone ports.

Proposed Trans-Isthmian Highway.—A further provision of the new treaty transfers to the Republic of Panama the jurisdiction over a corridor to connect the city of Colon, Republic of Panama, which is surrounded by the Canal Zone, with that portion of the Republic of Panama which joins the Canal Zone on the east. The use of this corridor is limited to the construction of a highway and the installation of electric power, telephone, and telegraph lines. By a separate convention, also concluded March 2, 1936, ratified by Panama the same year and ratified and proclaimed July 27, 1939, the United States and the Republic of Panama each agreed to construct certain portions of a trans-Isthmian highway. Such a highway has long been the desire of the Republic of Panama but has been prevented by numerous obstacles, among others the Panama Railroad Co.'s exclusive right to establish roads across the Isthmus of Panama. In order to remove this most important obstacle the Government of the United States in this convention undertakes to obtain a waiver

of its exclusive right from the Panama Railroad Co. To provide a highway across the Isthmus from the city of Colon to the city of Panama requires the construction of approximately 25 miles of roadway. A modern concrete highway already extends from the Pacific side to Madden Dam, about half the distance across the Isthmus.

Miscellaneous.—During the year, correspondence was conducted between the Government of the Canal Zone and the Republic of Panama with reference to various matters of local joint interest, arising from the relations of the two Governments and the proximity of their respective areas. The greater part of this correspondence was of a routine nature, dealing with matters relating to customs duties, immigration, municipal improvements, public health, postal service, repatriation of aliens, letters rogatory, and vital statistics.

CUSTOMS

The various activities of the bureau of customs were continued along the lines outlined in previous annual reports. The following is a statistical summary of the principal items, with the figures for the preceding year shown for comparison:

Item	Fiscal year 1933	Fiscal year 1935
Vessels entered.....	13,556	12,384
Vessels cleared.....	13,547	12,391
Aircraft entered.....	1,409	1,286
Aircraft cleared.....	1,413	1,287
Vessels of United States registry entered.....	3,985	4,006
Vessels of United States registry cleared.....	3,978	4,008
Customs releases on shipments consigned to Panama.....	12,804	13,448
Free-entry releases for shipments to employees of U. S. Government.....	6,533	6,054
Arrests for violation of Narcotic Drug Import and Export Act.....	0	0
Arrests for violation of customs regulations.....	28	20
Shipments of household goods of employees to United States, inspected and sealed for shipment to United States.....	95	68
Pieces of freight included in above.....	651	595
Invoices certified for shipment to United States.....	937	774
Special customs inspection out of regular hours:		
Cristobal.....	743	752
Balboa.....	513	475
Total.....	1,256	1,227
Cargo deposited to be held for orders (Canal Zone for orders):		
Cristobal.....		
Consignments received.....	67	94
Releases for delivery or forwarding.....	492	492
Balboa.....		
Consignments received.....	25	31
Releases for delivery or forwarding.....	174	167
Chinese passengers arriving.....	556	981
Chinese admitted to Panama.....	303	412
Vessels with Chinese crews checked.....	573	580

SHIPPING COMMISSIONER

The shipping commissioner and his deputies have the same authority as shipping commissioners in the United States ports and United States consuls in foreign ports with respect to United States seamen. During the fiscal year 1,214 seamen were shipped on vessels

of the United States and 1,046 discharged. No sick or destitute seamen were returned to the United States at the expense of the appropriation for relief of destitute American seamen, but 173 were signed as seamen or workaways and returned to the United States without expense to the Government.

The total wages earned by seamen who were discharged at Canal Zone ports amounted to \$73,241.69, and the total approved for deductions on account of advances, allotments, fines, slop-chest account, etc., was \$20,472.51. The balance of \$52,769.18 was either paid to seamen under the supervision of the deputy shipping commissioners or received on deposit for the seamen by the deputy shipping commissioners. The wages, money, and effects of six American seamen who died in Canal Zone hospitals during the year were handled by the shipping commissioner and remitted to the proper court in the United States for disposition.

ADMINISTRATION OF ESTATES

When provision for administration is not otherwise made by the deceased or requested by the legal heirs, the public administrator takes charge of all estates within the Canal Zone which require administration. In the case of estates with total assets exceeding \$1,000 value the public administrator charges the regular commissions fixed by law which are paid into the Treasury of the United States. Commissions amounting to \$1,210.26 were collected during the fiscal year. The estates of 167 deceased or insane persons, with cash assets of \$38,094.87, were settled during the fiscal year.

LICENSES AND TAXES

Licenses issued for motor vehicles, permits for peddling foodstuffs, the sale of merchandise generally, ships' runners, and similar purposes numbered 13,234 for the year, and 3,859 motor-vehicle licenses were transferred during the year.

The number of motor-vehicle licenses and transfers and miscellaneous licenses issued during the past 10 years and the aggregate fees collected therefor are summarized below. These include licenses for official vehicles for which no charge is made.

Fiscal year	Motor-vehicle	Motor vehicle transfers	Miscellaneous	Total	Fees
1930.....	7,280	1,862	1,064	10,206	\$45,604
1931.....	8,123	2,083	1,443	11,654	51,295
1932.....	8,577	1,906	1,312	11,795	52,143
1933.....	8,432	2,270	1,155	11,857	50,039
1934.....	8,389	2,311	1,392	12,092	52,796
1935.....	10,397	2,685	1,122	14,204	56,110
1936.....	10,268	3,276	1,258	14,802	61,482
1937.....	11,467	3,623	1,077	16,167	63,967
1938.....	11,885	3,871	1,146	16,902	66,574
1939.....	12,097	3,859	1,137	17,093	67,636

FOREIGN CORPORATIONS

Foreign corporations doing business in the Canal Zone are required to secure licenses, and for the past fiscal year 95 such corporations, the majority of which are steamship lines and steamship agencies, were licensed. Fees amounting to \$950 were collected. Taxes paid by corporations amounted to \$105.44.

INSURANCE

The license fee for insurance companies doing business in the Canal Zone is \$10 per year. At the end of the past fiscal year 16 insurance companies were licensed to write insurance in the Canal Zone. These companies reported that as of December 31, 1937, a total of 1,145 policies were in force. During the calendar year 1938, 223 policies were issued and 108 canceled, leaving 1,260 in force as of December 31, 1938, having an aggregate face value of \$4,240,391.81. Annual premium collections during the calendar year 1938 totaled \$208,964.79.

During the calendar year 1938 the premiums received by miscellaneous insurance companies, including accident, automobile liability, fire, surety, fidelity, etc., but excluding life insurance, amounted to \$68,119.33. Losses paid during the year totaled \$12,050.07.

The taxes of 1½ percent on premiums by all classes of insurance companies amounted to \$4,156.27 for the calendar year 1938, as compared with \$3,755.48 during the previous year.

COMMERCIAL AVIATION

The following information presents a brief picture of commercial aviation activity as pertaining to the Canal Zone for the year 1939 and, where available, comparative figures for the year 1938.

Number of passengers carried by regularly scheduled airlines

	1939	1938
Canal Zone and foreign:		
Incoming	4,374	3,660
Outgoing	4,436	4,274
Total	8,810	7,934
Trans-isthmian:		
Embarked at Albrook Field	2,663	
Embarked at France Field	1,663	
Total	4,326	4,947
Air express and mail (pounds):		
Entered	Pounds 72,365	Pounds
Cleared	213,806	
Total	1 286,171	1 242,948

¹ Does not include transhipped cargo which entered and cleared without being unloaded in the Canal Zone.

It will be noted that the Canal Zone and foreign passenger traffic showed an increase of approximately 11 percent. This increase was due to improved air-line schedules and in line with the general trend of closer relations and increased traffic between the United States and Central and South America. The Trans-Isthmian passenger traffic showed a decrease of approximately $12\frac{1}{2}$ percent. This traffic is made up almost entirely of patronage from tourist boat passengers and any increase or decrease is merely a reflection of changes in tour boat schedules. The amount of air express carried showed an increase of approximately 20 percent over the previous year. The increase is perhaps due to the same general reasons governing the increase of passenger traffic.

SECTION V

FINANCIAL AND STATISTICAL STATEMENTS

Financial statements of major interest relative to the operation of the Panama Canal are presented in this section. The statements are abstracted from the annual report of the accounting department of the Panama Canal.

ACCOUNTING SYSTEM

Accounts are maintained in accordance with statutory rules and regulations and accepted principles of appropriation and fund accounting prescribed for governmental bodies. However, the activities being of a quasi-business nature, the accounting system has been adapted to conform as nearly as practicable to the principles and practices approved by the Interstate Commerce Commission and State boards regulating public utilities as well as to procedures followed by comparable industries in the corporate field.

For purposes of valuating the investment, July 12, 1920, the date on which the Canal was formally declared open to commercial traffic by Presidential proclamation, was fixed as the close of the construction and development period of the Panama Canal.

Interest on United States Treasury funds advanced up to July 12, 1920, amounting to \$128,991,063; the treaty payment of \$10,000,000 to the Republic of Panama in 1904; and annual treaty payments aggregating \$2,000,000 to the Republic of Panama from 1913 to 1920 are considered as being construction costs and are so reflected in the capital investment account. Additions to the capital investment account are made from time to time by the inclusion of the cost of new capital additions; deductions are made of the amounts of assets withdrawn through sale and through retirement of depreciated items.

Obligations for treaty payments of \$250,000 annually to the Republic of Panama are reflected in operating accounts beginning with fiscal year 1921. A new treaty was effected with the Republic of Panama July 25, 1939, increasing the annual payments to \$430,000 retroactive to the fiscal year 1934. The additional liability of \$1,080,000 thereunder is not included in the accounts or statements comprising the annual report for the fiscal year 1939, but will be given cognizance when the appropriation bill to cover is passed by Congress.

Depreciation of depreciable property and equipment is charged to operations at accepted rates, the amounts so charged being accrued in offsetting valuation or depreciation reserve accounts. Using account balances as of the beginning of the fiscal year, accrued depreciation is deducted from gross capital to establish the investment upon which interest return is calculated.

Subsequent to the fiscal year 1920, a potential capital interest return of 3 percent has been considered as an unrecorded charge to expenses in determining computed surplus or deficit, while net revenues before interest charges have been used to calculate the actual rate of return on net capital investment.

Based on the foregoing, the gross capital investment at the beginning of the fiscal year 1939 was \$540,694,147.73, which after deducting depreciation of \$32,347,325.23 leaves a net capital investment of \$508,346,822.50. The net revenues of the Canal during the fiscal year 1939 amounted to \$13,841,071.19 on Canal operations and \$681,272.48 on business operations, a total of \$14,522,343.67. This net revenue is 2.86 percent of the net capital.

OPERATIONS OF THE PANAMA RAILROAD COMPANY

The results from the operations of the railroad proper and its various business units on the Isthmus are shown in detail in the accounts of the Panama Railroad Co. The detailed statement of revenue, expenses, and statistics for all railroad industries, changes in the capital account, and the results from the operations of the steamship line appear in the regular annual reports of the Panama Railroad Co. A review of these activities is presented in Section II of this report under the heading "Business operations under the Panama Railroad Co."

The result from all Panama Railroad operations on the Isthmus during the fiscal year 1939 was a net revenue of \$1,481,847.10, as compared with \$1,183,453.40 for 1938, an increase of \$298,393.70 for the year.

PANAMA CANAL OPERATIONS

The major financial results of Panama Canal operations are presented hereinafter in tables Nos. 1 to 27, with supplementary comments and explanations.

The following is a list of all of the tables and bureau reports contained in the annual report of the accounting department. The tables and reports Nos. 28 to 58, inclusive, are not printed because they are concerned principally with details of operations which lack general interest, and their publication would be an unwarranted expense. The complete report for the accounting department, as well as those of the other departments and divisions, is on file at the office of the Governor or at the Washington office of the Panama Canal. For

purpose of reference, the complete list of tables and reports for the accounting department is printed below. Following the list are presented the major tables, Nos. 1 to 27, inclusive, with various notes of explanation.

INDEX TO TABLES

*Table
No.*

1. General balance sheet.
2. Canal general property.
3. Floating plant.
4. Business fixed property.
5. Business equipment.
6. Capital assets, depreciable and nondepreciable.
7. Public works, Republic of Panama.
8. Cash receipts and disbursements, appropriated funds.
9. Cash receipts and disbursements, custodial funds.
10. Accounts receivable, registered, and outstanding.
11. Stores (material and supplies).
12. Work in progress.
13. Deferred charges.
14. Capital investment.
15. Accounts payable.
16. Depreciation reserves.
17. Reserve for repairs.
18. Reserve for leave.
19. Deferred credits.
20. Income, expenses, and net revenues (current).
21. Revenues, expenses, and computed surplus.
22. Capital refundments (miscellaneous receipts and Canal appropriations).
23. Balance of revenues and refundments.

DETAILS OF OPERATION FOR PROFIT AND LOSS

(Summaries on tables 20 and 21)

24. Canal revenues.
25. Canal earnings, expenses, and net revenues.
26. Business revenues, expenses, and net revenues.

MISCELLANEOUS

27. Balances in appropriation and fund accounts.
- 27A. Funded reserves, fiscal year 1939.

ADDENDA NOT PUBLISHED

28. Collections of United States funds by collector.
29. Cost of dredging.
30. Cost of electric current.
31. Cost of water.
32. Postal service—revenues, expenses, and surplus.
33. Postal service—money-order funds balance sheet.
34. Postal service—money orders issued and paid, 1907 to 1939, inclusive.
35. Trust funds—receipts and disbursements.
36. Clubs and playgrounds—balance sheet.
37. Clubs and playgrounds—income and expenditures.

Table
No.

38. Audited Isthmus pay rolls.
39. Pay-roll deductions.
40. { Silver quarters statistics.
- Rents and miscellaneous collections, silver employees.
41. Rent collections (gold quarters) from nonemployees.
42. Commissary coupons issued, sold, and honored.
43. Accounts payable registered—Panama Canal.
44. Accounts payable registered—Panama Railroad.
45. Personal injury claims.
46. Injuries and deaths, Panama Canal and Panama Railroad.
47. Injuries and deaths—Payments under various acts.
48. Damages to vessels.
49. Freight and cargo claims.
50. Shipments under Government Losses in Shipment Act (Public, No. 192, 75th Cong.)
51. Report of the Canal accounting bureau.
52. Report of the Railroad accounting bureau.
53. Report of the claims bureau.
54. Report of the pay-roll section, claims bureau.
55. Report of the auditing bureau.
56. Report of the coupon accounting bureau.
57. Report of the general bureau (mail, files, and employees' bonds).
58. Report of the inspection bureau.

TABLE NO. 1.—General balance sheet, June 30, 1939

ASSETS

Capital assets:	
Canal general property (table No. 2)	\$194,090,104.97
Floating plant (table No. 3)	7,942,298.96
Canal defense property	900,672.34
Business fixed property (table No. 4)	31,614,314.62
Business equipment (table No. 5)	3,446,763.63
Total capital assets	\$537,994,154.52
Reimbursable capital expenditures: Public works, Republic of Panama (table No. 7)	1,036,290.43
Revenue due U. S. Treasury (table No. 9)	146,989.66
Special funds:	
Security deposit funds (table No. 9)	\$696,149.05
Trust funds (table No. 9)	3,029,624.16
Total special funds	3,725,773.21
Working assets:	
Appropriated cash in U. S. Treasury (table No. 8)	\$4,213,240.25
Appropriated cash with fiscal officers (table No. 8)	1,981,812.70
Accounts receivable (table No. 10)	738,365.94
Stores (table No. 11)	4,642,916.98
Work in progress (table No. 12)	119,815.59
Total working assets	11,696,151.46
Deferred charges (table No. 13)	549,525.83
Total assets	555,148,885.11

TABLE NO. 1.—General balance sheet, June 30, 1939—Continued

LIABILITIES

Capital investment:

Net appropriations by Congress.....	\$414, 159, 381.95
Interest on appropriations.....	128, 991, 063.00

Total capital investment (table No. 14).....	\$543, 150, 444.95
Special fund obligations (see assets).....	3, 725, 773.21
Working liabilities: Accounts payable (table No. 15).....	1, 453, 573.16
Reserve for repairs (table No. 17).....	395, 504.13
Reserve for leave (table No. 18).....	427, 273.77
Deferred credits (table No. 19).....	460, 510.06
Revenues and refundments:	
Net revenues to June 30, 1938.....	\$245, 507, 712.40
Net revenues fiscal year 1939 (table No. 20).....	14, 522, 343.67
Total net revenues (table No. 21).....	260, 030, 056.07
Canal depreciation (table No. 16).....	21, 487, 543.04
Plant depreciation (table No. 16).....	12, 654, 307.53
Total.....	294, 171, 906.64
Less capital refundments (table No. 22).....	288, 636, 100.81
Balance of revenues and refundments (table No. 23).....	5, 535, 805.83
Total liabilities.....	555, 148, 885.11

The terms and arrangement of the foregoing balance sheet follow closely the generally accepted principles of corporate accounting, except as to the last item "Revenues and refundments." The statutes require that receipts for tolls, civil revenues, and net profits on business operations shall be covered into the United States Treasury, and relinquished from control of the Panama Canal.

Funds for current operating expenses and capital construction are appropriated by the Congress, and for accounting purposes are considered as provided from the tolls and other receipts covered into the Treasury. Practically all receipts other than those cited above are repayable to Canal appropriations, and may be reexpended, but as the Canal is deprived of tolls revenue, its principal source of income, the reexpendable receipts are insufficient to provide for operation and maintenance, thus requiring the Canal to submit its expenditure program annually to the Congress.

Total net revenues, appearing under the caption "Revenues and refundments," represent the accumulated operating earnings of the Panama Canal before capital interest charges. This net revenue, however, has been covered into the U. S. Treasury in the form of tolls and other receipts. It therefore follows that net capital refundments and net revenues earned will always be approximately the same, except for the fluctuation of unexpended appropriated cash and other working capital items.

These various fund requirements leave the Panama Canal balance sheet without an equivalent for the usual corporate "surplus account," since any surplus is included in the tolls covered into the Treasury, by law. However, the equivalent for "surplus account" is shown in table No. 21, which compares "Total net revenues" of \$260,030,056.07, appearing on the balance sheet, with the computed interest on the net capital investment, by fiscal years, beginning with 1921, but no interest charge against the Canal is actually made by the United States Treasury.

TABLE NO. 2.—*Canal general property, fiscal year 1939*

	Balance July 1, 1938	Additions and transfers	Retirements and transfers	Balance June 30, 1939
Channels, harbors, and basins:				
Balboa to Pedro Miguel	\$24,399,928.86			\$24,399,928.86
Pedro Miguel to Gatun	113,466,691.77			113,466,691.77
Gatun to Cristobal	12,829,445.51			12,829,445.51
Breakwaters				
Naos Island	1,075,874.10			1,075,874.10
Colon—East	3,994,727.10			3,994,727.10
Colon—West	4,528,829.57			4,528,829.57
Locks:				
Miraflores	24,644,389.24			24,644,389.24
Pedro Miguel	16,770,362.46			16,770,362.46
Gatun	37,914,498.12			37,914,498.12
Floating caisson	347,868.15			347,868.15
Towing locomotives	1,505,397.32			1,505,397.32
Dams:				
Miraflores	1,228,561.63			1,228,561.63
Pedro Miguel	457,302.32			457,302.32
Madden	9,770,375.23	\$5,695.83		9,770,071.06
Gatun	10,475,943.56			10,475,943.56
Gatun-Mindi levee	148,974.22			148,974.22
Spillways:				
Miraflores	1,398,684.94			1,398,684.94
Gatun	4,323,538.02			4,323,538.02
Aids to navigation:				
Channel aids	679,656.28			627,656.80
Sea buoy, retired			\$11,629.68	
Spar buoys, targets, etc., retired			40,219.80	
Tranit aids	62,808.84			24,191.04
Lock arrows, retired			6,734.28	
Moorings, retired			31,883.52	
Coastal aids	175,069.78			175,069.78
Lighthouse depot	46,486.63			50,700.85
Boat landing, replaced		5,976.10	1,761.88	
Wharves and piers:				
Balboa (Nos. 14 to 19)	4,417,826.38			4,102,186.34
Dock 15, old portion, retired			285,363.26	
Dock 15, new portion, transferred			30,276.78	
Gatun	274,589.81			295,430.46
Cristobal (Nos. 6, 14, 15)	2,753,278.57	20,840.65		2,753,278.57
Dry docks:				
Balboa	3,641,100.54			3,645,313.06
Drydock storage shed (addition)		4,212.52		
Cristobal	665,852.92			665,852.92
Coaling plant:				
Balboa	2,284,568.35			2,284,568.35
Cristobal	3,679,797.59			3,679,797.59
Dredging and barge plant:				
Ferry boat, transferred	1,124,496.20		255,860.15	870,736.05
Fleet office, Gamboa		4,100.00		
Thruway ferry plant:				588,925.17
Ferry boat, transfer		255,860.15		
Harbor, transfer		194,065.39		
Freight train transfer		42,711.90		
Brackwater transfer		58,287.73		
Ship transfer		58,000.00		
Title and treaty rights:				
Purchase price, New Panama Canal Co.	31,717,335.97			31,717,335.97
Treaty payment to Republic of Panama, 1914	10,000,000.00			10,000,000.00
Annual treaty payments to Republic of Panama, 1913-21	2,000,000.00			2,000,000.00

* Original purchase price of \$40,000,000, less Panama Railroad Co. capital stock and sales and transfers of property acquired.

TABLE No. 2.—*Canal general property, fiscal year 1939—Continued*

	Balance July 1, 1938	Additions and transfers	Retirements and transfers	Balance June 30, 1939
Titles and treaty rights—Continued.				
Relocation of Panama Railroad	\$9,800,626.46			\$9,800,626.46
Reequipment of Panama Railroad	3,247,332.11			3,247,332.11
Depopulation, Canal Zone	2,701,016.24			2,701,016.24
General buildings and structures:				
Office buildings	2,102,599.08			2,102,599.08
Gorgas Hospital	1,801,871.49			1,816,265.13
Steam plant (part)		\$14,393.64		
Corozal Hospital	549,263.22			549,263.22
Colon Hospital	314,615.86			349,127.20
Utility building		34,511.34		
Dispensaries	243,203.32			243,203.32
Palo Seco colony	109,762.61			130,616.55
Ward building No. 21		20,853.94		
Quarantine stations	65,392.70			65,392.70
Other health department structures	115,556.30			116,787.53
Mortuary chapel, Corozal (com- pleted)		1,231.23		
Clubs and playgrounds	996,138.63			299,123.28
Gymnasium, Balboa (completed)		18,745.05		
Gold clubhouse, Gamboa		416.70		
Gold playshed, Gamboa		809.04		
Silver clubhouse, Gamboa		433.48		
Silver playshed, Gamboa		12,396.57		
Swimming pool, Gamboa		6,053.64		
Bathhouse, Gamboa		335.13		
Grandstand, pool, Gamboa		11.98		
Gold tennis courts, Gamboa		5,641.99		
Silver tennis courts, Gamboa		5,571.72		
Silver grandstand, Gamboa		2,632.50		
Playshed, Gatun		6,547.35		
Playshed, New Cristobal		25,972.67		
Clubhouse business structures, trans- ferred			\$764,060.18	
Silver clubhouse, Paraiso, transferred			18,522.99	
Post offices	161,979.81			233,245.34
Ancon (completed)		71,265.53		
Schoolhouses	1,816,306.47			1,830,086.65
Shop school building, Balboa (com- pleted)		15,362.96		
Silver schoolhouse, Red Tank		20,586.00		
Silver schoolhouse, Paraiso, trans- ferred			2,023.53	
Silver schoolhouse, Paraiso, retired			18,562.65	
White schoolhouse, Paraiso, retired			1,582.60	
Fire stations	126,148.52			126,148.52
Police stations	202,661.84			293,735.79
Ancon, No. 419		30,355.66		
Pedro Miguel, No. 233		65,293.89		
Gamboa, No. 51 (completed)		44.40		
Ancon, No. 450, transferred			4,620.00	
Prisons	30,000.00			30,000.00
Courthouses	187,732.73			187,732.73
General storehouses, transferred	1,236,150.40		1,236,150.40	
Other buildings and structures	297,253.65			449,694.74
Commissary warehouse, Ancon, transfer		23,000.00		
Building No. 450, Ancon, transfer		4,620.00		
Police mess building, Balboa		862.72	862.72	
Lodge hall, Red Tank		5,630.71		
Building No. 329, Paraiso, transfer		18,522.99		
Building No. 58, Gamboa (completed)		129.87		
Combination store, Cristobal, trans- fer		103,000.00		
Police and customs booth, Cristobal		1,797.52		
Market building No. 361, Paraiso, retired			660.00	
Building No. 520, Cristobal, retired			3,600.00	
Permanent town sites	1,806,513.92			1,894,257.81
Ancon		12,739.04		
Balboa		34,808.59		
Gamboa		35,459.76		
Gatun		3,519.62		
Silver City		1,216.88		
Roads, streets, and sidewalks	5,061,702.73			4,870,072.97
Ancon		15,500.94		
Balboa		34,527.47		
Gamboa		17,630.93		
Gatun		7,777.40		
Culverts, Gaillard Highway		7,490.34		

TABLE NO. 2.—Canal general property, fiscal year 1939—Continued

	Balance July 1, 1938	Additions and transfers	Retirements and transfers	Balance June 30, 1939
Roads, streets, and sidewalks—Continued.				
Bridge across Cardenas River (net)		\$36,473.96		
Road, Corozal Cemetery		8,960.96		
Road, Mount Hope Cemetery		10,559.49		
Surveys, New Gamboa Road		2,483.77		
Ferry Plant, transferred			\$333,065.02	
Sewer system	\$727,807.64			\$750,135.69
Ancon		5,750.01		
Balboa		7,883.55		
Gamboa		4,953.77		
Gatun		2,581.61		
Silver City		1,159.11		
Street-lighting system	198,381.87			205,447.96
Ancon		3,694.65		
Balboa		2,930.93		
Gatun		440.51		
Plans for increasing capacity of Canal	34,600.05	100,400.00		135,000.05
Interest during construction period	128,991,063.00			128,991,063.00
Undistributed improvements, transferred	107,831.42	792,840.92	900,672.34	
Total, Canal general property	495,739,652.05	2,298,594.70	3,948,141.78	494,090,104.97

TABLE NO. 3.—Floating plant, fiscal year 1939

	Balance July 1, 1938	Additions and transfers	Retirements and transfers	Balance June 30, 1939
Tugs and craneboats	\$2,716,785.47			\$2,658,761.53
Gatun, adjustment			\$6,479.46	
Supply Boat No. 2, retired			51,544.48	
Launches	387,933.64			414,054.78
Bass, new (completed)		\$2,076.00		
Corbina, new		25,153.29		
Grouper, new (part)		687.23		
Gull, addition		3,191.31		
Marlin, new		13,989.17		
Owl, addition		265.65		
Wahoo, new (part)		809.07		
Chilibre, retired			2,381.09	
Cormorant, retired			6,379.54	
Goodwill, retired			4,146.80	
Gulchiche, transferred			7,143.15	
Dredges	2,570,236.01			2,570,236.01
Dump scows	1,480,484.75			1,550,530.73
No. 125, new (part)		70,045.98		
Machine barges	541,982.42			545,708.19
Relay barge, 24" (part)		3,725.77		
Lighters	176,198.07			203,007.72
Oil Barge No. 93, new		21,280.53		
Oil Barge No. 94, new		19,981.52		
Oil Barge No. 95, new (completed)		593.73		
Utility Barge No. 35, new		7,843.87		
Barge No. 98, retired			2,042.00	
Air Compressor Barge No. 27, retired			20,848.00	
Total, floating plant	7,873,620.36	169,643.12	100,964.52	7,942,298.96

TABLE NO. 4.—Business fixed property, fiscal year 1939

	Balance July 1, 1938	Additions and transfers	Retirements and transfers	Balance June 30, 1939
Hydroelectric plant, Gatun	\$1,755,785.01			\$1,755,785.01
Diesel electric plant, Miraflores	1,525,616.79			1,525,616.79
Substations	1,432,295.73			1,432,692.15
Miraflores—Oil circuit breakers, replaced		\$13,026.42	\$3,630.00	
Transmission system	1,560,695.81			1,560,695.81
Distribution system	1,613,799.66			1,653,224.13
Ancon, additions		11,650.29		
Balboa, additions		15,338.76		
Miraflores-Fort Clayton, additions		5,346.84		
Gatun, additions		7,088.58		
Malden dam system	1,295,278.67			1,302,275.85
Oil circuit breakers, replaced		20,023.60	13,026.42	
Total, electric power system	9,174,471.67	72,474.49	16,656.42	9,230,289.74

TABLE No. 4.—*Business fixed property, fiscal year 1939—Continued*

	Balance July 1, 1938	Additions and transfers	Retire- ments and transfers	Balance June 30, 1939
Electric work.....	\$236, 129. 71			\$234, 502. 12
Wireman's shop, Gamboa (completed).....		\$520. 16		
Bldg. No. 16, Gatun, retired.....			\$2, 147. 75	
Zone water system.....	1, 102, 694. 83			1, 192, 246. 41
Cone valve and wash water controller, Mount Hope filter plant (completed).....		3, 270. 78		
Water mains, Miraflores-West Side Canal.....		71, 591. 43		
Distribution lines:				
Balboa docks.....		11, 917. 86		
Ancon.....		1, 620. 50		
Balboa.....		8, 400. 03		
Gamboa.....		127. 81		
Gatun.....		1, 798. 17		
Venturi meter, Mount Hope filter plant, retired.....			1, 175. 00	
Distribution lines, Balboa docks, retired.....			8, 000. 00	
Zone-Panama water system.....	1, 926, 177. 61			1, 928, 888. 15
4-way valve, Miraflores filter plant (part).....		2, 710. 54		
Zone-Colon water system.....	786, 778. 00			788, 035. 78
Filter tables and valves, Mount Hope filter plant (part).....		1, 257. 78		
Total, water system.....	3, 815, 650. 44	102, 694. 90	9, 175. 00	3, 909, 170. 34
Municipal engineering work.....	24, 012. 79			123, 168. 37
Field office and plant, Ancon.....		93, 382. 09		
Office and storeroom, Balboa.....		3, 099. 71		
Shop building, Gamboa.....		2, 673. 78		
Balboa shops.....	2, 479, 497. 85			2, 507, 631. 03
Rigger shop (completed).....		22, 259. 79		
Paint shop, No. 6, extension.....		5, 873. 39		
Cristobal shops.....	580, 866. 47			580, 866. 47
Total, mechanical shops.....	3, 060, 364. 32	28, 133. 18		3, 088, 497. 50
Balboa fuel-oil plant.....	827, 164. 75			910, 751. 01
Oil lines, replaced.....		12, 994. 69	9, 000. 00	
Dock 4, alterations (completed).....		79, 591. 57		
Cristobal fuel-oil plant.....	1, 181, 411. 49			1, 181, 411. 49
Total, fuel-oil plants.....	2, 008, 576. 24	92, 586. 26	9, 000. 00	2, 092, 162. 50
General storehouses.....				1, 323, 547. 25
Transfer.....		1, 236, 150. 40		
Lumber shed, Gamboa, addition.....		1, 220. 96		
Lumber shed, Cristobal.....		86, 175. 89		
Motor transportation.....	147, 852. 79			157, 754. 00
Garage and shops, Ancon.....		9, 110. 65	507. 23	
Ramp, Gamboa garage.....		1, 297. 79		
Motorcar repair shops.....	127, 214. 47			127, 214. 47
Building division.....	74, 461. 38			74, 461. 38
Gold quarters.....	8, 279, 998. 42			8, 995, 199. 89
New quarters:				
Balboa.....		454, 118. 57		
Gamboa.....		116. 79		
Gatun.....		141, 552. 47		
Cristobal.....		41, 834. 67		
Building No. 891-X, Balboa, purchased.....		3, 000. 00		
Alterations:				
Balboa.....		43, 451. 26		
Pedro Miguel.....		2, 739. 20		
Cristobal.....		23, 583. 48		
Miscellaneous additions.....		9, 605. 03		
Retirements, various.....			4, 800. 00	
Silver quarters.....	1, 166, 404. 74			1, 189, 092. 06
New quarters:				
La Boca.....		28, 878. 64		
Gamboa.....		208. 68		
Retirements, various.....			6, 400. 00	
Rented buildings.....	126, 862. 72			
Transferred.....			126, 862. 72	
Garages.....	264, 115. 90			256, 594. 08
New stalls:				
Ancon.....		3, 661. 93		
Gatun.....		981. 41		
Retirements, various.....			12, 168. 16	
District quartermasters' supplies.....	48, 480. 69			48, 480. 69
Clubhouse business structures.....				764, 180. 23
Transfer.....		764, 060. 18		
Gold clubhouse, Gamboa.....		32. 35		
Swimming pool, Gamboa.....		87. 70		
Total, business fixed property.....	28, 554, 596. 28	3, 247, 435. 62	187, 717. 28	31, 614, 314. 62

TABLE NO. 5.—*Business equipment, fiscal year 1939*

	Balance July 1, 1938	Additions and transfers	Retire- ments and transfers	Balance June 30, 1939
Electric power system	\$247,909.42			\$249,025.03
Electric ranges		\$20,925.45		
Electric water heaters, retired			\$19,809.84	
Electric work	9,981.85			9,981.85
Municipal engineering work	306,714.90	48,207.87	6,154.33	348,768.44
Mechanical shops	1,966,392.26	103,515.66	39,846.01	2,030,051.91
General storehouses	110,775.26	6,432.68	4,468.00	112,739.94
Motor transportation	433,791.35			450,182.02
Motor vehicles:				
Purchased		53,557.49		
Retired			37,169.82	
Motorcar repair shops	48,855.70	2,091.42		50,857.12
Building division	80,492.03	1,357.29	1,873.69	79,975.63
Panama Canal Press	88,153.92	8,603.95		96,757.87
District quartermasters' supplies	18,417.36			18,383.82
Mirror factory equipment		426.46		
Gasoline station equipment, retired			400.00	
Farm bureau	2,117.50			
Launch <i>La Garza</i> , retired			2,117.50	
Total, business equipment	3,313,604.55	215,058.27	111,899.19	3,446,763.63

TABLE NO. 6.—*Capital assets, depreciable and nondepreciable, fiscal year 1939*

	Depreciable	Non- depreciable ¹	Balance June 30, 1939
Canal general property:			
Channels, harbors, and basins		\$150,606,066.14	\$150,606,066.14
Breakwaters		9,599,430.77	9,599,430.77
Locks	\$65,906,283.00	15,276,232.29	\$81,182,515.29
Dams:			
Madden	5,505,576.87	4,264,494.19	9,770,071.06
Other		12,310,781.73	12,310,781.73
Spillways	3,791,569.33	1,930,653.63	5,722,222.96
Aids to navigation	877,618.47		877,618.47
Wharves and piers	7,150,895.37		7,150,895.37
Drydocks	3,332,744.44	978,421.54	4,311,165.98
Coaling plants	5,964,365.94		5,964,365.94
Dredging division plant	870,736.05		870,736.05
Thatcher ferry plant	588,925.17		588,925.17
Titles and treaty rights		59,466,310.78	59,466,310.78
Office buildings	2,102,599.08		2,102,599.08
Gorgas Hospital	1,816,265.13		1,816,265.13
Corozal Hospital	549,263.22		549,263.22
Colon Hospital	349,127.20		349,127.20
Dispensaries	243,203.32		243,203.32
Palo Seco colony	130,616.55		130,616.55
Quarantine stations	65,392.70		65,392.70
Other health department structures	116,787.53		116,787.53
Clubs and playgrounds	299,123.28		299,123.28
Post offices	233,245.34		233,245.34
Schoolhouses	1,830,086.65		1,830,086.65
Fire stations	126,148.52		126,148.52
Police stations	293,735.79		293,735.79
Prisons	30,000.00		30,000.00
Courthouses	187,732.73		187,732.73
Other buildings and structures	449,694.74		449,694.74
Permanent town sites		1,894,257.81	1,894,257.81
Roads, streets, and sidewalks		4,870,072.97	4,870,072.97
Sewer system		750,135.69	750,135.69
Street lighting system		205,447.96	205,447.96
Plans for increasing capacity of Canal		135,000.05	135,000.05
Interest during construction period		128,991,063.00	128,991,063.00
Total, Canal general property (table No. 2)	102,811,736.42	391,278,368.55	494,090,104.97
Floating plant (table No. 3)	7,942,298.96		7,942,298.96
Canal defense property (incomplete)		900,672.34	900,672.34
Business fixed property (table No. 4)	31,614,314.62		31,614,314.62
Business equipment (table No. 5)	3,446,763.63		3,446,763.63
Total, capital assets	145,815,113.63	392,179,040.89	537,994,154.52

¹ Channels, harbors, basins, breakwaters, and municipal assets are maintained at original values from current operating expenses. Other nondepreciable property includes excavation and earth fill at locks, dams, and drydocks, and earth saddles at Madden Dam; also certain projects which were incomplete at the close of the fiscal year.

TABLE NO. 7.—*Public works in cities of Panama and Colon, fiscal year 1939*

	Panama	Colon	Total
Status of capital cost to June 30, 1939:			
Construction cost:			
Waterworks and sewers.....	\$876,353.22	\$623,883.68	\$1,500,236.90
Pavements.....	592,913.23	625,619.03	1,218,532.26
Total construction cost.....	1,469,266.45	1,249,502.71	2,718,769.16
Amortization:			
Waterworks and sewers.....	536,073.36	381,498.30	917,571.66
Pavements.....	368,921.88	395,985.19	764,907.07
Total amortization.....	904,995.24	777,483.49	1,682,478.73
Capital cost reimbursable:			
Waterworks and sewers.....	340,279.86	242,385.38	582,665.24
Pavements.....	223,991.35	229,633.84	453,625.19
Capital value, June 30, 1939.....	564,271.21	472,019.22	1,036,290.43
Operating detail, fiscal year, 1939:			
Operation, maintenance, and repairs:			
Waterworks and sewers.....	146,509.57	95,694.24	242,203.81
Pavements.....	11,923.93	2,466.55	14,390.48
Proportion, Zone system.....	91,419.12	38,877.51	130,296.63
Street cleaning and garbage collection.....	89,884.85	39,793.08	129,677.93
Total.....	339,737.47	176,831.38	516,568.85
Interest at 2 percent per annum:			
Waterworks and sewers.....	6,942.92	4,945.52	11,888.44
Pavements.....	4,570.21	4,685.35	9,255.56
Proportion, Zone system.....	12,355.04	5,720.70	18,075.74
Total.....	23,868.17	15,351.57	39,219.74
Amortization:			
Waterworks and sewers.....	18,514.46	13,188.08	31,702.54
Pavements.....	12,187.25	12,494.27	24,681.52
Total.....	30,701.71	25,682.35	56,384.06
Total charged to water rentals.....	394,307.35	217,865.30	612,172.65
Water rental collections in the Republic of Panama.....	394,307.35	217,865.30	612,172.65

The Panama Canal supplies water to the cities of Panama and Colon from the Canal Zone water system, and maintains the sewers and streets in the two cities under a contract entered into between the Panama Canal and the Republic of Panama in 1907. The Panama Canal collects the water rentals from the residents of these two cities and uses the funds to cover the cost of water and maintenance of sewers and streets, interest on the unamortized investment at 2 percent per annum and amortization based on 50 years from 1907.

Interest on the investment amounting to \$39,219.74 and amortization amounting to \$56,384.06 for fiscal year 1939 have been covered into the United States Treasury as miscellaneous receipts, making the totals to date, \$1,645,197.91 for interest, and \$1,682,478.73 for amortization.

TABLE No. 8.—*Receipts and disbursements, fiscal year ended June 30, 1939*

APPROPRIATED FUNDS

	Disbursing clerk, Washington, D. C.	Paymaster, Canal Zone	Collector, Canal Zone	Total	United States Treasurer	Total
Accountable balance July 1, 1938, by appropriations and funds:						
Maintenance and operation, Panama Canal.....	\$282,127.91	\$1,136,312.22	\$81,371.66	\$1,499,811.79	\$3,770,652.61	\$5,270,464.40
Sanitation, Canal Zone, Panama Canal.....	8,849.78	45,970.51	8,419.85	63,270.14	25,061.08	88,331.22
Civil government, Panama Canal and Canal Zone.....	7,310.91	\$3,578.10	3,436.75	94,325.76	43,718.21	138,043.97
Postal funds, Canal Zone (special fund).....		18,384.18	47,022.37	65,406.55	32,707.91	98,114.46
Repatriation of unemployed aliens, Panama Canal.....		5,368.26		5,368.26	109,000.00	103,368.26
Memorial to Maj. Gen. George W. Goethals.....	2,208.58			2,208.58	1,000.00	3,208.58
Total.....	300,497.18	1,289,613.27	140,280.63	1,730,391.08	3,973,139.81	5,703,530.89
Appropriations for fiscal year 1939:						
Maintenance and operation, Panama Canal.....					8,149,000.00	8,149,000.00
Sanitation, Canal Zone, Panama Canal.....					937,800.00	937,800.00
Civil government, Panama Canal and Canal Zone.....					1,167,325.00	1,167,325.00
Memorial to Maj. Gen. George W. Goethals.....					155,000.00	155,000.00
Total.....					10,405,125.00	10,405,125.00
Transfers between fiscal officers:						
Maintenance and operation, Panama Canal.....	3,900,000.00	12,006,357.40		15,906,357.40	85,314.28	15,991,671.68
Sanitation, Canal Zone, Panama Canal.....	107,000.00	1,552,257.16		1,659,257.16	67,173.19	1,726,430.35
Civil government, Panama Canal and Canal Zone.....	45,000.00	1,231,890.30		1,276,890.30		1,276,890.30
Postal funds, Canal Zone (special fund).....	6,500.00	215,000.00		221,500.00		545,032.09
Repatriation of unemployed aliens, Panama Canal.....		10,000.00		10,000.00		10,000.00
Total.....	4,058,500.00	14,995,504.86		19,054,004.86	476,019.56	19,530,024.42
Collections repayable to appropriations:						
Maintenance and operation, Panama Canal.....	91,834.74	277,024.20	8,481,235.41	8,850,094.35	146.45	8,850,240.80
Sanitation, Canal Zone, Panama Canal.....	68,000.46		679,337.61	747,338.07	423.64	747,761.71
Civil government, Panama Canal and Canal Zone.....			130,956.05	130,956.05	13.98	130,970.03
Postal funds, Canal Zone (special fund).....			333,250.11	333,250.11		333,250.11
Total.....	159,835.20	277,024.20	9,624,759.18	10,061,618.58	584.07	10,062,202.65
Total cash debits.....	4,518,832.38	16,562,142.33	9,765,039.81	30,846,014.52	14,854,808.44	45,700,822.96
Covered into the United States Treasury: Business net revenues, fiscal year 1938, maintenance and operation, Panama Canal.....					784,282.06	784,282.06

Appropriated funds comprise the working cash for operation and development of the Panama Canal, and are derived from annual appropriations by the Congress, augmented by collections for sales and services which by law are repayable to Canal appropriations, any net revenue derived therefrom to be covered into the United States Treasury.

There are three regular appropriations for the Panama Canal covering maintenance and operation, sanitation, and civil government. In addition, postal receipts from the sale of stamps and from money-order fees, which are deposited in Treasury subject to withdrawal, are reexpendable for the operation of Canal Zone post offices, but money-order funds, including postal savings, are handled separately under "Custodial funds" in the following table.

Occasionally special appropriations are made by the Congress for specific purposes, usually available until expended, such as for repatriation of unemployed aliens, and memorial to Maj. Gen. George W. Goethals, shown in the foregoing table.

TABLE No. 9.—Receipts and disbursements, fiscal year ended June 30, 1939

CUSTODIAL FUNDS

	Disbursing clerk, Wash- ington, D. C.	Paymaster, Canal Zone	Collector, Canal Zone	Total	U. S. Treasury	Total
Accountable balance July 1, 1938:						
Revenue due U. S. Treasury:						
Security deposits	\$70.00		\$138,380.50	\$138,380.50		\$138,380.50
Trust funds:			516,851.02	516,851.02	\$5,250.56	522,171.58
Clubhouse funds			169,796.98	169,796.98		169,796.98
Money-order funds			2,536,489.71	2,536,489.71		2,536,489.71
Miscellaneous trust funds			17,246.93	17,246.93		17,246.93
Total	70.00		3,378,705.14	3,378,835.14	5,250.56	3,384,085.70
Receipts:						
Revenue due U. S. Treasury		6.00	23,882,007.00	23,882,087.81		23,882,087.81
Security deposits	18,446.99	5,314,137.94	29,461,946.04	34,794,530.97		34,794,530.97
Trust funds:						
Clubhouse funds			934,669.17	934,669.17		934,669.17
Money-order funds			3,371,057.13	3,371,057.13		3,371,057.13
Miscellaneous trust funds			40,927.83	40,927.83		40,927.83
Total	19,420.50	5,314,144.84	57,690,607.17	63,024,172.91		63,024,172.91
Total to be accounted for	19,440.40	5,314,144.84	61,069,372.31	66,403,008.05	5,250.56	66,408,258.61
Transfer to U. S. Treasury:						
Clubhouse funds			1,261,766.96	1,261,766.96	261,766.96	
Money-order funds			1,320,513.50	1,320,513.50	3,205,134.50	
Total cash debits			57,602,470.85	62,133,106.51	3,472,152.02	
Covered into the U. S. Treasury: Revenue due U. S. Treasury			23,873,377.84	23,874,378.05		23,874,378.05
Transfers and refunds: Security deposits	973.91	6.00	29,282,747.60	34,615,302.94		34,620,553.50
Disbursements:	18,417.40	5,314,137.94			5,250.56	
Trust funds:						
Clubhouse funds			840,786.18	840,786.18	77,139.57	917,925.75
Money-order funds			2,674,430.39	2,674,430.39	390,012.69	3,064,443.08
Miscellaneous trust funds			38,174.76	38,174.76		38,174.76
Total	19,391.31	5,314,144.84	56,729,556.77	62,063,042.92	472,402.82	62,535,445.74
Accountable balance June 30, 1939:						
Revenue due U. S. Treasury			146,989.66	146,989.66		146,989.66
Security deposits	99.59		696,049.46	696,149.05		696,149.05
Trust funds:						
Clubhouse funds			1,913.01	1,913.01	184,627.39	186,540.40
Money-order funds			27,961.95	27,961.95	2,815,121.81	2,843,083.76
Total	99.59		872,914.08	873,013.67	2,009,744.20	3,872,762.87
Total cash credits	19,440.90	5,314,144.84	57,602,470.85	62,535,106.59	3,472,152.02	66,408,258.61

1 Denotes deduction.

* Includes \$1,908,092.13 invested in U. S. Treasury bonds, and \$290,262.26 in Federal farm loan bonds, total \$2,198,354.39.

Custodial funds cover cash transactions which are controlled by separate fiscal regulations from those which govern the expenditure of appropriations made by Congress for maintenance and operation of the Panama Canal.

Revenue due United States Treasury covers collections for deposit as miscellaneous receipts of the United States Government which form no part of the working cash of the Panama Canal, as these funds must by law immediately be covered into the United States Treasury and relinquished from control of the Panama Canal. These collections consist mainly of tolls, licenses, court fees and fines, and amortization of public works in Panama and Colon.

Security deposits cover cash received by Canal fiscal officers from banks, individuals, and companies to guarantee payment of bills rendered by the Panama Canal and the Panama Railroad Co., and to guarantee fulfillment of contracts. Disbursements of these funds represent transfers to revenue due United States Treasury on this table, collections repayable to appropriations on the preceding table, and the return of unexpended balances to depositors.

Trust funds cover certain activities conducted by the Canal Zone Government separately from appropriations, principally postal money-order funds, and transactions of Panama Canal clubhouses maintained exclusively for employees.

During the fiscal year 1939 the depository for trust funds was changed from commercial banks to the Treasury of the United States, and is so reflected in table 9.

TABLE NO. 10.—*Accounts receivable*
REGISTERED DURING THE YEAR

	Fiscal year 1939	Fiscal year 1938
Repaid to appropriations:		
Panama Railroad Co.....	\$1,945,679.17	\$2,087,270.39
Other departments of the U. S. Government.....	2,157,844.42	1,529,065.72
Individuals and companies.....	3,429,330.14	3,772,977.87
Total.....	7,532,853.73	7,389,313.98
Miscellaneous receipts:		
Tolls.....	23,699,430.02	23,215,207.39
Public works, Republic of Panama.....	95,603.80	96,715.21
Total.....	23,795,033.82	23,311,922.60
Total accounts receivable registered.....	31,327,887.55	30,701,236.58
Number of bills registered.....	37,474	37,000
OUTSTANDING ACCOUNTS RECEIVABLE		
Audited bills.....	\$703,430.46	\$644,936.85
Hospital certificates.....	30,768.68	31,616.20
Injury compensation.....	4,057.40	4,527.07
Unredeemed commissary coupons.....	109.40	41.58
Total.....	738,365.94	681,121.70

The outstanding balance at the end of the fiscal year includes all accounts due the Panama Canal except items of utility service, principally for employees, which are not credited to earnings until collected, usually by pay-roll deductions.

TABLE NO. 11.—*Material and supplies*

	Fiscal year 1939	Fiscal year 1938
Stock on hand, first of year:		
Balboa store.....	\$3, 126, 890. 74	\$2, 627, 306. 50
Medical store.....	84, 021. 33	83, 541. 21
Administration building store.....	26, 424. 52	32, 473. 95
Gamboa store.....	440, 526. 08	392, 928. 31
Cristobal store.....	582, 343. 89	548, 017. 92
Locks store.....	555, 585. 09	582, 153. 97
Fuel-oil plants.....	145, 041. 59	192, 333. 03
Panama Canal Press.....	80, 498. 41	72, 833. 18
Sand and gravel pile.....	77, 660. 59	110, 272. 63
Division stores.....	207, 736. 45	255, 860. 72
Total stock card value.....	5, 326, 728. 69	4, 897, 721. 42
Reserve for inventory adjustments.....	343, 860. 70	389, 165. 37
Book value of stock on hand.....	4, 982, 867. 99	4, 508, 556. 05
Receipts of material:		
Purchases for stock.....	3, 773, 641. 08	4, 726, 827. 09
Purchases for divisions.....	484, 415. 16	519, 657. 56
Local production.....	826, 336. 89	666, 565. 02
Service charges.....	358, 739. 02	418, 487. 29
Book value of receipts.....	5, 443, 162. 15	6, 331, 536. 96
Total charges to stock.....	10, 426, 030. 14	10, 840, 093. 01
Issues and sales of material:		
Issues to business divisions.....	3, 097, 826. 11	3, 236, 707. 22
Issues to Canal divisions.....	1, 362, 089. 00	1, 314, 586. 46
Variation in division stores.....	29, 955. 99	48, 124. 27
Total issues.....	4, 489, 871. 10	4, 599, 417. 95
Sales.....	1, 293, 242. 06	1, 257, 807. 07
Total issues and sales.....	5, 783, 113. 16	5, 857, 225. 02
Stock on hand, end of year:		
Balboa store.....	2, 798, 937. 81	3, 126, 890. 74
Medical store.....	84, 779. 43	84, 021. 33
Administration building store.....	31, 616. 09	26, 424. 52
Gamboa store.....	401, 078. 94	440, 526. 08
Cristobal store.....	589, 396. 81	582, 343. 89
Locks store.....	534, 830. 86	555, 585. 09
Fuel-oil plants.....	54, 957. 08	145, 041. 59
Panama Canal Press.....	76, 686. 61	80, 498. 41
Sand and gravel pile.....	170, 113. 78	77, 660. 59
Division stores.....	177, 780. 46	207, 736. 45
Total stock card value.....	4, 920, 177. 87	5, 326, 728. 69
Reserve for inventory adjustments.....	277, 260. 89	343, 860. 70
Book value of stock on hand.....	4, 642, 916. 98	4, 982, 867. 99

In the foregoing table, the values of stock on hand at the beginning and end of the year are shown at invoiced cost including ocean freight.

The storehouse stock-card price includes an added percentage to cover handling cost. This item is shown as "Service charges" under "Receipts of material" and is also reflected in the total of sales and issues.

TABLE NO. 12.—*Work in progress*

	Fiscal year 1939	Fiscal year 1938
Electrical division.....	\$2,841.37	\$3,337.14
Municipal division.....	31.05	.....
Shops and drydocks.....	109,637.11	123,757.76
Building division.....	64.15	.....
Panama Canal Press.....	7,241.88	3,049.13
Total.....	119,515.59	135,144.03

This account covers the amounts expended on uncompleted jobs, and will ultimately be cleared to operating expenses of the divisions indicated, with corresponding credits to their revenues after application of authorized surcharge.

TABLE NO. 13.—*Deferred charges*

	Fiscal year 1939	Fiscal year 1938
Clubs and playgrounds.....	\$125.34	\$93.34
Civil government.....	.....	997.37
Health department.....	385.56	1,568.24
Office engineer.....	1,103.79	2,627.45
Special engineering section.....	27,611.92	.....
District quartermaster, Balboa.....	.....	434.16
Port Captain, Balboa.....	1,503.02	1,616.76
Lighthouse subdivision.....	282.55	282.55
Atlantic locks.....	.....	74,262.38
Dredging division.....	208,687.41	203,678.77
General accounts, suspense.....	1,297.13	2,793.56
Electric power system.....	.....	1,248.12
Electric work.....	.....	228.77
Water system.....	1,235.00	200.00
Municipal work.....	6,806.33	28,725.27
Shops and drydocks.....	43,877.58	44,268.51
Fuel oil plants.....	142.00	430.84
General storehouses.....	3,353.44	5,838.90
Building division.....	125,021.53	173,162.65
Silver quarters.....	500.00	.....
District quartermasters' supplies.....	2,565.85	3,091.63
Public works:		
Panama.....	77,010.45	30,913.54
Colon.....	47,216.03	5,920.22
Total.....	549,525.83	582,323.03

This account covers expenses incurred for account of divisions indicated, but which are not chargeable to operating accounts of the current year. These amounts are cleared as soon as values are consumed.

TABLE NO. 14.—*Capital investment*

Appropriations for Canal construction to June 30, 1921 (detail in annual report for 1924, table No. 3).....	\$386,910,301.00
Deduct value of capital stock of the Panama Railroad Co.....	7,000,000.00
Net construction appropriations.....	379,910,301.00
Annual payments to the Republic of Panama, 1913 to 1920 (State Department).....	2,000,000.00
Additional construction funds, July 1, 1921, to June 30, 1939.....	32,249,080.95
Total cash investment.....	414,159,381.95
Interest on construction funds (compounded annually) 1904 to 1920.....	128,991,063.00
Total capital investment.....	543,150,444.95

The capital investment account covers the following assets, showing the total as of June 30, 1938, the increase for the current fiscal year, and the total as of June 30, 1939.

	June 30, 1938	Increase	June 30, 1939
Canal general property (table No. 2).....	\$195,739,652.05	¹ \$1,649,547.08	\$494,090,104.97
Canal defense property.....	.....	900,672.34	900,672.34
Floating plant (table No. 3).....	7,873,620.36	68,678.60	7,942,298.96
Business fixed property (table No. 4).....	28,554,596.28	3,059,718.34	31,614,314.62
Business equipment (table No. 5).....	3,313,604.55	133,159.08	3,446,763.63
Public works, Republic of Panama (table No. 7).....	1,092,674.49	¹ 56,384.06	1,036,290.43
Proportion of working capital (table No. 23).....	4,120,000.00	.....	4,120,000.00
Total capital assets.....	540,694,147.73	2,456,297.22	543,150,444.95
Less accrued depreciation (table No. 16).....	32,347,325.23	1,794,525.34	34,141,850.57
Net capital investment.....	508,346,822.50	661,771.88	509,008,594.38

¹ Denotes decrease.

The total capital investment at the close of the fiscal year 1939 amounted to \$543,150,444.95. The increase of \$2,456,297.22 is due to the making of necessary additions to plant and equipment as shown on capital tables Nos. 2, 3, 4, and 5.

Interest on the net capital investment from 1922 to date is considered as a charge to operating expenses, and while this charge does not appear on the balance sheet a statement of such interest compared with net revenues, by years, is shown on table No. 21. Interest for the current fiscal year is based upon the net capital investment of \$508,346,822.50, as of June 30, 1938, and amounts to \$15,250,404.68.

TABLE NO. 15.—*Outstanding accounts payable*

	Fiscal year 1939	Fiscal year 1938
United States invoices.....	\$178,976.36	\$48,465.33
Isthmus vouchers.....	85,391.06	80,747.47
Current pay rolls.....	1,155,895.50	1,103,113.47
Unpaid salaries and wages.....	27,241.40	30,412.45
Drums, carboys, and reels.....	8,101.27	7,465.27
Local purchases.....	¹ 2,032.43	¹ 302.72
Total.....	1,453,573.16	1,269,902.27

¹ Denotes debit.

The above table covers all current obligations of the Panama Canal, except deposits to guarantee payment of bills, and trust funds, both of which are covered by table No. 9, custodial funds.

TABLE No. 16.—*Depreciation reserves, fiscal year 1939*

CANAL DEPRECIATION

	Balance July 1, 1938 (adjusted)	Accruals	Retire- ments	Balance June 30, 1939
Locks.....	\$11,080,521.98	\$493,365.69	—	\$11,573,920.67
Madden Dam.....	104,356.33	55,055.76	—	219,412.09
Spillways.....	490,371.96	21,320.52	—	511,692.48
Aids to navigation.....	450,288.48	11,799.84	\$81,388.07	380,700.25
Wharves and piers.....	2,303,403.63	129,680.41	175,369.22	2,248,714.82
Dry docks.....	731,575.65	42,226.04	—	773,801.69
Coaling plants.....	3,036,492.00	151,821.60	—	3,188,316.60
Dredging division plant.....	416,510.58	21,800.51	—	438,311.09
Thatcher ferry plant.....	176,256.18	29,391.03	—	205,647.21
Office buildings.....	390,555.70	21,449.68	—	415,005.38
Gorgas Hospital.....	359,102.33	18,125.51	—	377,227.84
Corozal Hospital.....	83,530.04	6,224.01	—	89,754.05
Colon Hospital.....	67,611.73	4,248.61	—	71,860.34
Dispensaries.....	49,424.87	3,301.04	—	52,725.91
Palo Seco colony.....	35,437.11	3,201.03	—	38,638.14
Quarantine stations.....	63,572.78	1,819.92	—	65,392.70
Other health department structures.....	26,829.90	2,187.98	—	29,017.88
Clubs and playgrounds.....	68,271.75	3,751.05	—	72,022.80
Post offices.....	5,728.80	1,507.62	—	7,236.42
Schoolhouses.....	196,877.83	22,086.46	6,214.45	212,749.84
Fire stations.....	30,706.69	2,673.29	—	33,379.98
Police stations.....	14,700.00	3,857.01	—	18,557.01
Prisons.....	4,500.00	750.00	—	5,250.00
Courthouses.....	81,153.35	3,754.65	—	84,908.00
Other buildings and structures.....	234,613.63	7,685.49	4,431.00	237,868.32
Contingent reserve.....	128,037.13	142,882.05	135,487.65	435,431.53
Total, Canal depreciation.....	20,600,433.43	1,203,000.00	402,890.39	21,487,543.04

The balance as of July 1, 1938, has been adjusted as follows:

Balance, June 30, 1938, as shown in 1938 report.....	\$21,364,393.43
Add items transferred from plant depreciation.....	25,919.00
Other buildings and structures:	
Commissary warehouse, Bldg. 363, Ancon.....	\$4,613.84
Combination store, Bldg. No. 1020, Cristobal.....	20,816.16
Police officers' mess, Bldg. No. 801-S, Balboa.....	459.00
	21,390,312.43
Deduct items transferred to plant depreciation.....	690,879.00
General storehouses.....	\$490,349.36
Clubhouse business structures.....	209,529.64
Adjusted balance, July 1, 1938.....	20,600,433.43

PLANT DEPRECIATION

	Balance July 1, 1938 (adjusted)	Accruals	Retire- ments	Balance June 30, 1939
Floating plant:				
Tugs.....	\$818,819.48	\$98,220.00	\$51,544.48	\$865,495.00
Launches.....	203,568.36	31,205.24	12,907.43	221,866.17
Dredges.....	1,478,020.00	88,080.00	—	1,566,100.00
Dump scows.....	899,872.60	62,880.00	—	962,752.60
Machine barges.....	265,705.30	24,420.00	—	290,125.30
Lighters.....	115,672.08	8,150.00	22,890.00	100,932.08
Total, floating plant.....	3,781,657.82	312,955.24	87,341.91	4,007,271.15
Business fixed property:				
Electric power system.....	1,669,260.19	133,920.00	3,630.00	1,799,550.19
Electric work.....	28,649.54	6,720.36	2,147.75	33,222.15
Water system.....	817,116.00	72,908.00	9,175.00	880,849.00
Municipal work.....	4,437.93	484.50	—	4,922.43
Mechanical shops.....	729,106.03	63,260.83	—	792,366.86

TABLE No. 16.—*Depreciation reserves, fiscal year 1939—Continued*

PLANT DEPRECIATION

	Balance July 1, 1938 (adjusted)	Accruals	Retire- ments	Balance June 30, 1939
Business fixed property—Continued.				
Fuel-oil plants.....	\$712,955.36	\$79,795.44	\$9,000.00	\$783,750.80
General storehouses.....	490,349.36	28,074.00		518,423.36
Motor transportation.....	10,484.44	5,371.70		15,856.14
Motor car repair shops.....	9,192.32	2,712.00		11,904.32
Building division.....	9,145.50	2,106.00		11,251.50
Gold quarters.....	1,297,437.55	165,600.00	4,800.00	1,458,237.55
Silver quarters.....	337,931.04	33,536.23	6,400.00	365,067.27
Garages.....	227,973.37	8,595.91	12,168.16	224,401.12
Clubhouse business structures.....	209,529.64	20,322.84		229,852.48
District quartermasters' supplies.....	5,847.45	2,457.00		8,304.45
Total, business fixed property.....	6,559,424.81	625,864.81	47,320.91	7,137,968.71
Business equipment:				
Electric power system.....	70,066.95	25,725.34	19,809.84	75,982.46
Electric work.....	5,104.57	816.00		5,920.57
Municipal work.....	178,073.35	30,675.74	6,154.33	202,594.76
Mechanical shops.....	715,000.56	89,949.99	39,346.01	765,095.54
General storehouses.....	65,458.50	6,611.50	4,468.00	67,602.00
Motor transportation.....	231,285.93	53,251.43	37,169.82	247,367.54
Motor car repair shops.....	19,871.76	3,973.25		23,845.01
Building division.....	55,143.95	5,611.69	1,873.69	58,881.95
Panama Canal Press.....	45,661.19	3,500.76		49,161.95
District quartermasters' supplies.....	10,864.02	2,208.87	460.00	12,612.89
Farm bureau.....	1,984.00	133.50	2,117.50	
Total, business equipment.....	1,398,517.79	222,449.07	111,899.19	1,509,067.67
Total, business fixed property and equip- ment.....	7,957,942.60	848,313.88	159,220.10	8,647,036.38
Total, plant depreciation.....	11,739,600.42	1,161,269.12	246,562.01	12,654,307.53

The balance as of July 1, 1938, has been adjusted as follows:

Balance, June 30, 1938, as shown in 1938 report.....	\$10,982,031.80
Add items transferred from Canal depreciation.....	699,879.00
General storehouses.....	\$490,349.36
Clubhouse business structures.....	209,529.64
Add item transferred from reserve for repairs.....	90,000.00
Mechanical shops.....	\$90,000.00
	11,772,810.80
Deduct items transferred to Canal depreciation.....	25,919.00
Other buildings and structures:	
Commissary warehouse, Bldg. No. 363, Anecon.....	\$4,643.84
Combination store, Bldg. No. 1020, Cristobal.....	20,816.16
Police officers' mess, Bldg. No. 801-S, Balboa.....	459.00
Deduct item transferred to reserve for repairs.....	7,291.38
District quartermasters' supplies, Gatun dock (gasoline sales).....	\$7,291.38
Adjusted balance, July 1, 1938.....	11,739,600.42

SUMMARY

	Balance July 1, 1938 (adjusted)	Accruals	Retire- ments	Balance June 30, 1939
Canal depreciation.....	\$20,690,433.43	\$1,200,000.00	\$402,890.39	\$21,487,543.04
Plant depreciation.....	11,739,600.42	1,161,269.12	246,562.01	12,654,307.53
Total depreciation.....	32,430,033.85	2,361,269.12	649,452.40	34,141,850.57

The accrued balance as of June 30, 1939, for Canal depreciation applies to depreciable Canal general property shown on table No. 6, amounting to \$102,811,736.42, and for plant depreciation applies to floating plant, business fixed property, and business equipment shown in tables Nos. 3, 4, and 5 amounting to \$43,003,377.21.

TABLE No. 17.—*Reserve for repairs*

	Balance July 1, 1938 (adjusted)	Accruals	Charges	Balance June 30, 1939
Tugs and craneboats.....	\$22,357.92	\$79,200.00	\$58,188.34	\$43,369.58
Ferry boats.....	1,844.91	3,600.00	2,785.06	
Dredges.....	13,074.25	252,000.00	169,886.89	79,038.56
Dump scows.....	53,486.16	126,240.00	196,016.73	116,290.57
Machine barges.....	110,900.42	22,920.00	17,517.84	115,498.26
Lighters.....	7,063.47	8,000.00	165.14	14,808.33
Total, floating plant.....	68,117.94	491,960.00	441,560.00	115,517.94
Electric power system, fixed property.....	15,074.37		15,074.37	
Electric work, fixed property.....	5,964.66	3,371.52	1,316.27	8,019.91
Electric work, equipment.....	32,083.96	33,340.59	40,542.42	24,882.13
Shops and drydocks, fixed property.....	36,576.84	11,251.31	47,831.15	
Shops and drydocks, equipment.....	15,533.23	19,416.85	34,980.08	
Wharves and piers, fixed property.....	171,084.27	74,000.00	26,283.42	218,800.85
General storehouses, fixed property.....	17,933.45		2,439.79	15,493.66
Motor transportation, equipment.....	18,932.19	15,865.71	34,847.90	
Panama Canal Press, fixed property.....	3,534.36	1,500.00	2,129.10	2,905.26
District quartermasters' supplies, fixed prop- erty.....	7,291.38	1,579.02		8,870.40
Sand and gravel, equipment.....	438.16	2,770.01	2,194.19	1,013.98
Total, fixed property and equipment.....	324,496.87	163,128.01	207,638.69	279,986.19
Total, reserve for repairs.....	392,614.81	655,088.01	652,198.69	395,504.13

¹ Denotes debit.

The balance as of July 1, 1938, has been adjusted as follows:

Balance, June 30, 1938, as shown in 1938 report.....	\$475,323.43
Add item transferred from plant depreciation.....	7,291.38
District quartermasters' supplies Gatun dock (gasoline sales).....	7,291.38
	482,614.81
Debit item transferred to plant depreciation.....	90,069.00
Shops and drydocks, equipment.....	90,000.00
Adjusted balance, July 1, 1938.....	392,614.81

TABLE No. 18.—*Reserve for leave*

	Fiscal year 1939	Fiscal year 1938
Electrical division.....	\$125,480.51	\$124,488.13
Municipal division.....	64,989.30	62,510.44
Shops and drydocks.....	172,228.76	173,623.13
Motor transportation.....	16,274.94	11,857.61
Motorcar repair shops.....	15,557.90	16,399.11
Building division.....	32,742.36	33,653.85
Total.....	427,273.77	425,537.27

The foregoing table represents the reserve for vacation pay due employees of the principal business divisions. This reserve is created by adding a percentage to direct labor charges for work performed by the division listed above to the credit of this account. The account is debited with the amount paid to employees when leave is actually taken.

TABLE No. 19.—*Deferred credits*

	Fiscal year 1939	Fiscal year 1938
Executive offices.....	\$4,525.01	\$1,852.27
Comptroller's office.....	1,848.00	3,075.48
Civil government.....	28,595.58	22,106.81
Postal service.....	39,532.83	38,057.70
Health department.....	11,724.11	5,882.07
Office engineer.....	5,369.81	11,232.47
Surveys.....	250.00	954.13
District quartermaster:		
Pedro Miguel.....	146.76	361.94
Balboa.....	5,087.88	
Gamboa.....	161.84	147.06
Pacific locks.....	30,185.62	6,396.95
Atlantic locks.....		1,493.25
Dredging division.....	3,100.11	
General accounts suspense.....	44,789.10	595.99
Farm bureau.....	543.69	4,678.19
Electric power system.....	1,348.30	
Electric work.....	98.14	
Municipal division.....	148,480.81	57,358.16
Shops and drydocks.....	40,437.20	34,748.18
Fuel-oil plants.....	6,849.58	
General storehouses.....	5,538.49	4,706.49
Building division.....	18,371.01	10,535.85
Panama Canal Press.....		1,671.90
Gold quarters.....	14,500.00	
District quartermasters' supplies.....	1,067.39	586.28
Nautical charts and publications.....	1,662.24	1,092.33
Contingencies:		
Maintenance and operation.....	45,394.82	45,410.43
Sanitation.....	753.67	743.42
Civil government.....	148.07	148.07
Total.....	460,510.06	253,835.42

This account covers expenses accrued or estimated which have been charged to operating accounts, but for which it was unpracticable to institute corresponding payments at close of the accounting period. These amounts are cleared as soon as corresponding charges are passed for payment, or contingent expenses arise.

TABLE NO. 20.—Consolidated statement of income, expenses, and net revenues

	Fiscal year 1939	Fiscal year 1938
Canal operations:		
Canal revenues:		
Tolls	\$23,699,413.82	\$23,215,192.39
Postal surplus	18,959.36	
Other miscellaneous receipts	87,970.19	90,335.19
Total Canal revenues (table No. 24)	23,806,343.37	23,305,527.58
Canal earnings (table No. 25)	3,095,706.89	3,252,970.16
Total revenues	27,502,050.26	26,558,497.74
Canal expenses:		
Executive department	491,960.17	489,508.72
Clubs and playgrounds	83,000.00	83,000.00
Accounting department	558,597.54	552,360.23
Washington office	269,389.50	268,814.04
Civil Government	1,299,688.23	1,251,868.83
Postal service	330,000.00	317,042.99
Health department	1,709,738.02	1,694,854.20
Office engineer	169,159.61	187,114.52
Special engineering section	175,708.75	46,385.73
Section of surveys	83,941.01	115,573.44
Public buildings and grounds	392,762.22	375,021.17
Marine division	1,692,888.08	1,517,440.46
Locks operation and maintenance	1,574,569.35	1,567,218.47
Locks overhaul	433,001.60	
Dams and spillway	72,161.01	67,896.55
Dredging division	2,276,558.85	2,189,011.00
Municipal expenses	293,773.73	239,207.55
Railroad tracks maintenance	19,981.15	22,337.63
Recruiting and retraining employees	26,654.89	14,851.92
Transportation of employees on Isthmus	124,800.54	125,283.60
Damage to vessels	50,000.00	17,520.93
Miscellaneous, general expense	103,844.82	23,179.50
Depreciation on general property	1,200,000.00	1,200,000.00
Annual payment to Republic of Panama	250,000.00	250,000.00
Total expenses	13,660,979.07	12,648,594.48
Net canal revenues (table No. 25)	13,841,071.19	13,909,903.26
Fixed capital charge	14,458,111.05	14,403,613.43
Surplus (or deficit)	¹ 617,039.86	¹ 553,710.17
Business operations:		
Business revenues	18,236,320.31	17,940,845.32
Business expenses	17,555,047.83	17,116,232.72
Net business revenues (table No. 26)	681,272.48	824,612.60
Fixed capital charge	792,293.63	766,378.81
Surplus (or deficit)	¹ 111,021.15	58,233.79
Combined operations:		
Revenues	45,738,370.57	44,499,343.06
Expenses	31,216,026.90	29,764,827.70
Net revenues	14,522,343.67	14,734,515.36
Fixed capital charge at 3 percent	15,250,404.68	15,229,992.24
Surplus (or deficit)	¹ 728,061.01	¹ 495,476.38
Capital investment (table No. 14)	508,346,822.50	507,696,408.67
Combined net revenues	14,522,343.67	14,734,515.36
Percent of capital return	2.86	2.90

¹ Denotes deficit.

A summary comparison of net revenues and capital interest, by years, from 1921 to date, is shown on table No. 21, following, together with a brief description of accounting policy governing charges to operating expenses.

TABLE No. 21.—*Revenues, expenses, and computed surplus*

Fiscal year	Tolls	Civil revenues	Business profits	Total revenues	Net appropriation expenses ¹	Net revenues	Capital interest 3 percent ²	Computed surplus ³
1914-20.....	\$33,303,581.67	\$1,206,579.86	\$336,095.34	\$35,046,259.87	\$36,057,766.89	\$1,011,507.02	-----	\$1,011,507.02
1921.....	11,193,919.31	213,985.19	564,211.20	12,040,116.70	9,578,300.14	2,461,816.56	\$14,674,964.74	\$12,213,143.18
1922.....	11,193,383.47	102,208.85	325,259.16	11,708,851.48	8,439,017.63	3,269,833.85	15,253,780.02	\$12,013,946.17
1923.....	17,307,630.62	184,213.51	1,140,642.50	18,832,485.56	8,240,777.56	10,591,709.00	15,202,430.18	\$3,610,721.18
1924.....	24,280,003.16	392,225.73	901,624.12	25,583,478.01	8,923,935.39	16,659,572.62	15,150,930.33	\$1,508,672.29
1925.....	21,374,651.12	207,931.04	765,915.85	22,348,531.01	8,666,693.44	13,681,841.57	15,039,730.49	\$1,417,855.92
1926.....	22,927,416.03	217,630.70	841,310.29	23,986,446.82	8,543,463.47	15,442,978.35	15,055,830.64	\$357,397.71
1927.....	24,217,185.32	391,621.50	876,531.30	25,485,345.62	9,547,715.02	15,937,630.60	15,063,580.79	\$869,049.81
1928.....	23,943,513.11	232,542.57	736,719.43	24,912,775.11	9,501,200.82	15,411,564.29	15,035,029.29	\$376,535.00
1929.....	27,123,534.33	349,391.39	737,850.26	28,104,775.93	10,187,150.71	17,917,625.27	15,013,374.55	\$2,904,250.72
1930.....	27,077,117.36	340,255.35	760,971.66	28,187,344.37	9,893,920.93	18,293,423.44	14,987,927.89	\$3,305,895.55
1931.....	24,644,550.39	345,030.35	562,764.17	25,553,344.91	10,693,353.53	14,859,991.32	14,846,578.04	\$3,285,866.06
1932.....	20,621,558.49	327,444.23	562,764.17	21,501,108.16	10,239,211.84	11,351,893.32	14,943,807.63	\$3,591,011.34
1933.....	19,621,158.01	310,014.16	1,135,705.62	21,096,881.39	9,555,672.02	17,777,103.18	15,039,293.01	\$3,390,522.79
1934.....	24,065,065.16	94,696.67	1,396,755.12	25,558,456.95	7,751,353.57	17,747,102.62	15,140,732.62	\$2,737,899.37
1935.....	23,338,977.90	81,917.68	1,021,216.61	24,442,152.19	9,301,429.57	15,031,829.77	13,124,192.30	\$1,907,637.47
1936.....	23,500,801.40	119,952.21	920,185.23	24,540,938.93	9,405,077.13	15,035,861.05	13,159,697.04	\$1,876,234.01
1937.....	23,147,433.54	98,775.74	917,562.14	24,163,569.42	10,109,631.05	14,033,915.37	13,203,397.30	\$1,151,451.93
1938.....	23,215,192.39	90,335.19	821,612.60	24,130,110.18	9,397,624.92	14,732,485.26	13,229,392.24	\$1,493,470.38
1939.....	23,699,413.82	106,929.55	631,772.48	24,437,615.85	9,963,272.18	14,522,343.67	13,250,401.03	\$1,273,061.01
Total.....	453,164,755.10	5,409,745.30	16,172,111.02	474,746,611.48	214,710,555.41	260,030,056.07	236,418,806.24	\$20,383,749.17

¹ After deduction of Canal earnings repaid to appropriations.² Interest prior to July 12, 1920, is included in capital-investment account.³ Deficits.

The above table summarizes by classes the revenues received by the Panama Canal by fiscal years from 1921 and shows the net results from operations after deducting therefrom the net current expenses chargeable to appropriations and the current interest charge on the capital investment. The interest rate of 3 percent has been used in making computations a great many years. The use of this rate received the approval of two organizations which investigated Panama Canal matters and was formally adopted when the present accounting system was established in 1932. It has been considered a fair and reasonable rate, as the Government at various times has paid much higher rates for the use of money.

Interest chargeable to operations is not included on the balance sheet and no interest charge against the Canal is actually made by the United States Treasury.

Total revenues on the foregoing statement represent receipts which must be covered into the United States Treasury and relinquished from control of the Panama Canal. Earnings repayable to Canal appropriations, and reexpendable by the Canal, are deducted from gross operating expenditures, in order to present a comparison of funds covered into the Treasury with funds chargeable to operating account, exclusive of capital additions.

The absence of tax charges is compensated for by the inclusion in Canal operating accounts of the direct costs of civil government, health and welfare activities. Neither capital nor operating expenses of the Panama Canal include the cost of the military and naval establishments on the Isthmus; however, all important exchanges of services with these interests are covered by cash settlements, or reciprocal allowances.

By including in the accounts all revenues properly applicable to Canal activities and by charging against the total revenue the net appropriation expenses including charges for depreciation and interest at 3 percent on the capital invested but excluding any charge to amortize the investment, there has accumulated as of June 30, 1939, as shown by the foregoing table, a deficit of \$26,388,749.17.

TABLE No. 22.—*Capital refundments*

Balance June 30, 1938.....	\$272, 176, 267.88
Cash covered into U. S. Treasury.....	24, 658, 060.71
Business profits (table No. 8).....	\$784, 282.06
Revenue due U. S. Treasury (table No. 9).....	23, 874, 378.65
Total.....	296, 834, 928.59
Appropriations, fiscal year 1939 (detail below).....	10, 655, 125.00
Less: Net capital additions, current year (table No. 14).....	2, 456, 207.22
Net appropriation for operating account.....	8, 198, 827.78
Net capital refundments, June 30, 1939.....	288, 636, 100.81

SCHEDULE OF OPERATING APPROPRIATIONS ¹

Fiscal year	Maintenance and operation	Sanitation	Civil government	Miscellaneous	Annual payment to Panama	Total
1914-1924.....	\$59,018,907	\$6,800,000	\$7,126,670	² \$151,344.55	³ \$1,000,000	\$71,096,921.55
1925.....	5,851,210	56,266	991,670	-----	250,000	7,679,146.00
1926.....	7,140,000	653,216	942,150	-----	250,000	8,985,366.00
1927.....	5,986,094	670,090	999,980	-----	250,000	7,906,074.00
1928.....	5,830,000	670,000	1,100,000	-----	250,000	7,850,000.00
1929.....	6,832,000	722,000	1,172,400	-----	250,000	8,976,400.00
1930.....	8,000,000	820,000	1,201,000	-----	250,000	10,271,000.00
1931.....	10,162,470	753,900	1,295,190	-----	250,000	12,461,560.00
1932.....	9,359,808	782,189	1,351,689	-----	250,000	11,743,686.00
1933.....	11,591,011	755,650	1,300,000	-----	250,000	14,196,661.00
1934.....	11,172,700	698,426	1,235,278	³ 1,150,000.00	250,000	14,506,404.00
1935.....	4,971,490	763,501	792,035	-----	250,000	6,782,926.00
1936.....	6,900,000	874,616	1,022,981	-----	250,000	9,047,597.00
1937.....	9,149,201	899,793	1,073,950	-----	250,000	11,372,944.00
1938.....	8,519,090	918,000	1,131,760	⁴ 5,000.00	250,000	10,823,760.00
1939.....	8,140,000	933,800	1,167,325	4 155,000.00	250,000	10,655,125.00
Total.....	178,932,591	18,306,357	23,904,978	1,461,344.55	4,750,000	227,355,570.55
Less: Net capital additions, 1922 to 1939 (table No. 14).....						32,219,080.95
Net appropriation for Canal maintenance and operation.....						195,106,489.60

¹ Operating appropriation includes authorization for capital construction.² Appropriations for increase in compensation.³ N. R. A., \$1,000,000; repatriation of unemployed aliens, \$150,000.⁴ Appropriation for memorial to Maj. Gen. George W. Ootha s.⁵ Covers payments to Panama 1921 to 1924. Payments from 1913 to 1920 charged to cost of construction, \$2,000,000.

The total deposits covered into the United States Treasury from the beginning of Canal construction, with minor adjustments to reconcile changes in accounting process, amount to \$483,742,590.41, and deducting therefrom net appropriations for operation amounting to \$195,106,489.60 as shown above, produces the net capital refundment balance of \$288,636,100.81. Deposits covered into the Treasury consists principally of the earned revenues cited in table No. 21, which total \$474,746,611.48, the balance being made up of sales of property, principally during the construction period, and return of appropriation balances.

Although above table shows a net cash refundment of \$288,636,100.81, such refundment is not deductible from net capital investment as shown in table No. 14, which is considered as measuring the value of the Panama Canal as an instrument of public utility upon which a perpetual return should be earned; furthermore, annual interest on net asset valuation chargeable to operating account is not included in cash transactions with the United States Treasury. Such interest at 3 percent from 1921 to 1939 would have amounted to \$286,418,805.24 as shown in table No. 21, and would have extinguished all capital refundments to date, if such interest charges had been assessed against Canal revenues.

TABLE NO. 23.—*Balance of revenues and refundments*

DEBITS	
Revenue due U. S. Treasury (table No. 9)	\$146,989.66
Appropriated cash in U. S. Treasury (table No. 8)	4,213,210.25
Appropriated cash with fiscal officers (table No. 8)	1,981,812.70
Accounts receivable (table No. 10)	738,335.94
Stores (table No. 11)	4,612,916.98
Work in progress (table No. 12)	119,815.59
Deferred charges (table No. 13)	519,525.83
Total debits	12,392,666.95
CREDITS	
Accounts payable (table No. 15)	1,453,573.16
Reserve for repairs (table No. 17)	395,504.13
Reserve for leave (table No. 13)	427,273.77
Deferred credits (table No. 19)	460,510.06
Total credits	2,736,861.12
Net current accounts	9,655,805.83
Less proportion under capital investment (table No. 14)	4,120,000.00
Balance	5,535,805.83

A revolving fund now fixed at \$4,120,000, is set up in Canal accounting for working capital, and is credited to capital investment account in addition to funds used for construction and equipment, the total constituting the base for capital interest computations. Net working capital in excess of the revolving fund is considered as a temporary advance of Treasury funds, but is usually less than appropriated funds not withdrawn from the Treasury. Working capital investments are in constant process of accrual and liquidation for account of the United States Treasury.

TABLE NO. 24.—*Canal revenues*

	Fiscal year 1939	Fiscal year 1938
Tolls	\$23,699,413.82	\$23,215,192.39
Postal surplus	18,959.36	—
Licenses, fees, fines, etc.	86,910.89	87,963.36
Miscellaneous	1,059.30	2,371.83
Total	23,806,343.37	23,305,527.58

Canal revenues shown above comprise earnings which by law must be covered into the United States Treasury as miscellaneous receipts, United States revenues, and relinquished from control of the Panama Canal, as distinguished from earnings repayable to Canal appropriations shown in tables Nos. 25 and 26.

Owing to a change in the law made effective at the beginning of the fiscal year 1934 the appropriation for postal expenses was discontinued, and postal receipts have been applied to defray such expenses, instead of being covered directly into the United States Treasury, as formerly, and only the surplus of postal receipts over postal expenses is for account of United States revenues.

TABLE No. 25.—*Canal earnings, expenses, and net revenues*

	Expenses	Earnings	Net expenses
Executive department:			
Executive offices	\$491,960.17	\$177,953.17	\$314,007.00
Clubs and playgrounds	83,000.00		83,000.00
Total.....	574,960.17	177,953.17	397,007.00
Accounting department:			
Comptroller's office.....	461,839.42	293,340.15	168,499.27
Paymaster's office.....	46,123.67	26,340.00	19,783.67
Collector's office.....	50,634.45	33,374.50	17,259.95
Total.....	558,597.54	353,054.65	205,542.89
Washington office.....	260,389.50	49,952.00	219,437.50
Civil government:			
Civil affairs	19,093.76		19,093.76
Customs	33,734.20	413.60	33,321.20
Division of schools.....	540,389.74	64,382.77	476,016.97
Fire protection	151,697.74	115.35	151,582.39
Police and prisons.....	528,185.35	67,452.11	460,733.24
Magistrates' courts.....	18,997.07		18,997.07
District court.....	7,580.37		7,580.37
Total.....	1,299,688.23	132,363.23	1,167,325.00
Postal service.....	330,000.00	330,000.00	
Health department:			
Chief health office.....	49,764.29		49,764.29
Gorgas Hospital.....	767,254.21	376,897.94	390,356.27
Colon Hospital.....	173,246.23	96,216.48	77,029.75
Corozal Hospital.....	109,101.52	23,114.17	85,987.35
Palo Seco colony.....	43,311.58	28,211.33	15,100.25
Line dispensaries.....	98,104.36	33,761.91	64,342.45
Quarantine service.....	77,006.87	23,725.50	53,281.37
Sanitation:			
Panama.....	33,700.38	1,446.89	32,253.49
Colon.....	21,217.33	2,879.90	18,337.43
Zone.....	164,037.43	60,005.97	104,031.46
Street cleaning and garbage collection:			
Panama.....	119,846.43	89,884.85	29,961.58
Colon.....	53,057.39	39,793.08	13,264.31
Total.....	1,709,738.02	775,938.02	933,800.00
Technical divisions:			
Office engineer.....	169,159.61	130,926.05	38,233.56
Special engineering section.....	175,708.75	175,708.75	
Surveys.....	89,941.01	25,116.91	64,824.10
Total.....	434,809.37	331,751.71	103,057.66
Public buildings and grounds:			
Chief quartermaster's office.....	46,126.41	35,580.00	10,546.41
District quartermaster:			
Balboa.....	192,912.43	65,775.45	127,136.98
Pedro Miguel.....	28,282.81	18,376.82	9,905.99
Gamboa.....	22,945.08	14,284.68	8,560.40
Gatun.....	20,656.59	11,127.05	9,529.54
Cristobal.....	81,938.90	50,373.05	31,565.85
Total.....	392,762.22	195,517.05	197,245.17
Marine division:			
Marine superintendent.....	27,950.02	5,069.75	22,880.27
Port captain, Balboa:			
General.....	124,197.66	6,196.39	118,001.27
Admeasurement of vessels.....	29,712.19		29,712.19
Pilotage.....	169,882.89	76,550.00	93,332.89
Handling lines.....	126,195.02	131,056.00	¹ 4,860.98
Tugs.....	130,997.41	90,374.00	40,623.41
Launches.....	86,254.49	82,880.00	3,374.49
Port captain, Cristobal:			
General.....	64,048.02	686.85	63,361.17
Admeasurement of vessels.....	39,461.00		39,461.00
Pilotage.....	191,471.22	217,824.00	¹ 26,352.78
Handling lines.....	143,283.03	150,080.00	¹ 6,796.97
Tugs.....	139,658.78	129,903.25	9,755.53
Launches.....	66,989.90	70,769.00	¹ 3,779.10
Aids to navigation.....	322,756.45	116,049.77	206,706.68
Total.....	1,662,888.08	1,077,439.01	585,449.07

TABLE NO. 25.—*Canal earnings, expenses, and net revenues—Continued*

	Expenses	Earnings	Net expenses
Locks operation and maintenance:			
Pacific locks:			
Miraflores Locks	\$582,888.21		\$582,888.21
Pedro Miguel Locks	420,840.35		420,840.35
Total	1,003,728.56		1,003,728.56
Atlantic locks:			
Gatun Locks	570,840.79		570,840.79
Quadrennial overhaul	433,001.60		433,001.60
Total	1,003,842.39		1,003,842.39
Total	2,007,570.95		2,007,570.95
Dams and spillways:			
Gatun Dam	27,088.72		27,088.72
Gatun Spillway	4,542.25		4,542.25
Madden Dam	40,530.04		40,530.04
Total	72,161.01		72,161.01
Dredging division:			
Atlantic entrance	17,040.34		17,040.34
Gatun Lake	248,410.16		248,410.16
Gaillard Cut	1,365,270.20		1,365,270.20
Miraflores Lake	4,964.52		4,964.52
Pacific entrance	82,422.92		82,422.92
Cristobal Harbor	245,996.41		245,996.41
Balboa Harbor	126.86		126.86
Removal of floating obstructions	30,789.74		30,789.74
Maintenance of floating cranes	46,342.37		46,342.37
Dredging division work	238,186.33	\$233,419.18	4,767.15
Total	2,279,558.85	233,419.18	2,046,139.67
Municipal expenses:			
Street lighting	20,018.32		20,018.32
Water for municipal purposes	23,400.00		23,400.00
Roads, streets and sidewalks	145,090.44		145,090.44
Sewer system	14,909.56		14,909.56
Thatcher ferry	90,355.41		90,355.41
Total	293,773.73		293,773.73
Miscellaneous general expenses:			
Railroad tracks maintenance	19,481.15		19,481.15
Recruiting and repatriating employees	19,692.80		19,692.80
Repatriating alien ex-employees	6,962.09		6,962.09
Transportation on the Isthmus	124,600.54		124,600.54
Damage to vessels	50,000.00		50,000.00
Canal Zone experiment gardens	47,931.36	38,318.87	9,612.49
Depreciation on general property	1,200,000.00		1,200,000.00
Annual payment to the Republic of Panama	250,000.00		250,000.00
Settlement of agricultural leases	4,465.50		4,465.50
Cash relief to alien ex-employees	51,447.96		51,447.96
Net Canal expenses	13,660,979.07	3,695,706.89	9,965,272.18

SUMMARY

Canal revenues (table No. 24)	\$23,806,313.37
Net Canal expenses	9,965,272.18
Net Canal revenues	13,841,041.19

¹ Denotes credit balance.

The earnings of the divisions engaged in the transiting of vessels through the Canal, as well as earnings of sanitation and civil government divisions, are deducted from gross expenses to arrive at the net expenditure from Canal appropriations, which in turn is deducted from Canal revenues to arrive at net Canal revenues, exclusive of business division profits.

Earnings of the executive offices and accounting department represent principally a proportional charge against business divisions

of the Panama Canal and the Panama Railroad Co. Business divisions are reimbursed for this proportional expense by adding a surcharge to the direct cost on all work performed. The Panama Railroad's proportion is distributed to the various units of that organization.

The expense of \$83,000 shown for the clubs and playgrounds was the expense of operation and maintenance of the playgrounds subdivision of this Bureau. The clubhouse subdivision is supported from the revenue derived from its business activities.

The earnings of the Washington office include \$49,952 charged against business storehouse operations to cover a proportional part of the cost of purchasing, inspection, and handling of material used by business divisions or sold to outside interests, which expense is covered through surcharges added to the price of material.

TABLE No. 26.—*Business expenses, revenues, and profit or loss*

Division	Expenses	Revenues	Profit or Loss
Electric power system	\$582,040.08	\$878,622.91	\$296,582.83
Electric work	796,223.27	807,055.52	10,832.25
Telephone, telegraph, and signal work	167,699.79	167,699.79	-----
Water system	478,764.32	526,288.04	47,524.62
Municipal work	1,699,859.39	1,711,934.23	12,074.84
Shops and drydocks	3,100,226.05	3,128,068.28	27,842.23
Fuel oil plants	511,375.56	617,172.66	105,797.10
General Storehouses:			
Regular operations	5,361,776.15	5,394,123.78	32,347.63
Sale of Government property (net)	-----	5,165.57	5,165.57
Motor transportation	376,521.12	418,743.13	42,222.01
Motor car repair shops	191,058.60	196,959.01	5,900.41
Building division	2,232,879.49	2,246,371.74	13,492.25
Panama Canal Press	221,213.42	235,294.11	14,085.69
Gold quarters	575,738.83	576,403.57	664.74
Silver quarters	300,215.34	300,280.84	65.50
Garaes	24,834.22	33,197.75	8,363.53
District quartermasters' supplies	285,928.06	299,445.97	13,517.91
Sand and gravel operations	75,741.23	81,314.86	5,573.63
Public works, Panama	370,439.18	394,307.35	23,868.17
Public works, Colon	202,513.73	217,865.30	15,351.57
Total	17,555,047.83	18,236,320.31	681,272.48

The profit on business operations as above, amounting to \$681,272.48 compares with profits in 1938 of \$824,612.60.

Profits on public works, Panama and Colon, amounting to \$39,219.74, represent interest which has been currently reported for coverage into general funds of the United States Treasury. The balance of the total profits, amounting to \$642,052.74, will be immediately covered into the Treasury as miscellaneous receipts, United States revenues, in accordance with regulations.

Business operations of the Panama Canal are conducted separately from operating activities pertaining directly to the transiting of vessels and government of the Canal Zone. The annual appropriation acts for the Panama Canal authorize the use of appropriated funds for the conduct of auxiliary business activities, provided that funds so advanced are recovered through earnings, and with further proviso that any net profit derived from such business activities be covered annually into the United States Treasury.

TABLE No. 27.—Balances in appropriation and fund accounting ledger, June 30, 1939

Assets		U. S. Treasury appropriations	Cash on hand	Accounts receivable	Transfers available	Work in progress and suspense	Storehouse stock	Total
Maintenance and operation, Panama Canal		\$3,817,588.96	\$1,778,382.07	\$630,451.60	\$83,166.46	\$287,408.64	\$4,538,000.61	\$11,124,611.24
Sanitation, Canal Zone, Panama Canal		44,302.48	50,477.81	94,573.17	-----	-----	90,000.81	209,392.57
Civil government, Panama Canal and Canal Zone		30,037.19	71,307.97	4,985.87	-----	-----	14,300.56	159,631.59
Postal funds, Canal Zone (special fund)		39,231.62	71,019.24	9,350.00	-----	-----	-----	119,690.86
Repatriation of unemployed aliens, Panama Canal		90,000.00	8,386.13	-----	-----	-----	-----	98,386.13
Memorial to Maj. Gen. George W. Goethals		150,000.00	2,208.58	-----	-----	1,701.42	-----	160,000.00
Miscellaneous receipts, United States revenues		-----	146,989.66	-----	642,052.74	-----	-----	789,042.40
Total		4,213,240.25	2,128,802.30	738,305.94	705,219.20	280,200.06	4,642,016.08	12,717,744.79
Liabilities		Working capital allotment	Accounts payable	Transfers payable	Special liabilities	Funded reserves	Balance	Total
Maintenance and operation, Panama Canal		\$4,010,000.00	\$1,224,152.61	\$842,052.74	-----	\$4,269,648.75	\$978,757.14	\$11,124,611.24
Sanitation, Canal Zone, Panama Canal		100,000.00	127,481.74	33,788.61	\$12,092.22	-----	-----	209,392.57
Civil government, Panama Canal and Canal Zone		10,000.00	90,210.35	22,697.59	28,743.65	-----	5,000.00	156,651.59
Postal funds, Canal Zone (special fund)		-----	15,086.90	6,509.22	39,532.83	-----	57,901.85	119,690.86
Repatriation of unemployed aliens, Panama Canal		-----	41.50	111.04	-----	-----	98,233.50	98,386.13
Memorial to Maj. Gen. George W. Goethals		-----	-----	-----	-----	-----	160,000.00	160,000.00
Miscellaneous receipts, United States revenues		-----	789,042.40	-----	-----	-----	-----	789,042.40
Total		4,120,000.00	2,242,615.50	705,219.20	80,368.70	4,269,648.75	1,299,892.58	12,717,744.79

This table shows the status of Panama Canal working capital by the various appropriations and funds by which it is separately accountable under existing laws and Treasury regulations.

A revolving fund of \$4,120,000.00 is set aside in Canal accounting to cover the net investment in current accounts, which sum is included in the capital investment account (table No. 14).

The following table shows the detail of the funded reserves stated in the foregoing table as \$4,269,648.75.

TABLE NO. 27—A.—*Funded reserves, fiscal year 1939*

	Balance July 1, 1938 (adjusted)	Accruals	Expenditures	Balance June 30, 1939
Marine division:				
Tugs and crane boats	\$199,291.28	\$29,640.00		\$228,931.28
Launches	83,343.32	21,465.24		68,543.22
Launch <i>Corbina</i> , purchase			\$25,153.29	
Launch <i>Guichiche</i> , transferred			17,143.15	
Launch <i>Gull</i> , addition			3,191.31	
Launch <i>Martin</i> , construction			13,989.17	
Launch <i>Owl</i> , addition			265.65	
Launch <i>Wahoo</i> , construction			809.07	
Machine barges	11,073.26	420.00		11,493.26
Total	293,707.86	51,525.24	36,265.34	308,957.76
Dredging division:				
Tugs and crane boats	40,072.11	68,580.00		115,131.57
Tug <i>Gatun</i> , adjustment			16,479.46	
Launches	5,576.33	9,740.00		12,553.10
Launch <i>Bass</i> , construction			2,076.00	
Launch <i>Grouper</i> , construction			657.23	
Dredges	176,160.00	88,080.00		264,240.00
Dump scows	253,072.45	62,880.00		245,906.47
No. 125, construction			70,045.98	
Machine barges	208,166.72	24,000.00		232,166.72
Lighters	73,548.53	8,150.00		31,998.88
Oil barge No. 93, construction			21,280.53	
Oil barge No. 94, construction			19,981.52	
Oil barge No. 95, construction			593.73	
Utility barge No. 35, construction			7,843.87	
Total	756,596.14	261,430.00	116,029.40	901,996.74
Total, transit divisions	1,050,304.00	312,955.24	152,291.74	1,210,964.50
Electric power system:				
Hydroelectric plant, Gatun	127,181.95	32,520.00		159,701.95
Diesel electric plant, Miraflores	50,754.22	27,840.00		78,594.22
Substations	186,178.11	29,040.00		195,194.51
Oil circuit breakers, purchase			20,023.60	
Transmission system	68,238.27	23,520.00		91,758.27
Madden Dam system	49,369.37	21,000.00		70,369.37
Electric ranges	70,584.46	25,725.34		96,309.80
Total	552,306.38	159,645.34	20,023.60	691,928.12
Electric work:				
Fixed property	24,161.54	6,720.36		30,881.90
Equipment	3,720.85	816.00		4,536.85
Total	27,882.39	7,536.36		35,418.75
Water system:				
Pump station buildings	19,672.53	3,884.00		23,056.53
Pump station machinery	42,962.39	7,844.00		50,506.39
Filter plant buildings	75,107.73	16,872.00		91,979.73
Filter plant machinery	33,890.74	6,600.00		33,251.64
Wash water controller, Mount Hope			3,270.78	
4-way valve, Miraflores			2,710.54	
Filter tables and valves, Mount Hope			1,257.78	
Reservoirs and tanks	40,090.27	7,440.00		47,530.27
Pipe lines—large mains	116,035.12	16,826.00		132,871.12
Pipe lines—distribution	78,455.91	14,432.00		88,284.53
8-inch line, dock No. 16, Balboa			4,603.38	
Total	406,214.69	72,908.00	11,842.48	467,280.21
Municipal work:				
Fixed property	992.60	484.50		1,477.10
Equipment	41,638.95	30,675.74	38,240.26	34,074.43
Total	42,631.55	31,160.24	38,240.26	35,551.53

¹ Indicates reduction of expenditures.

TABLE NO. 27-A.—*Funded reserves, fiscal year 1939—Continued*

	Balance July 1, 1938 (adjusted)	Accruals	Expenditures	Balance June 30, 1939
Mechanical division:				
Balboa shops	\$50, 128. 61	\$43, 819. 75		\$71, 688. 57
Rigger shop (completed)			\$22, 259. 79	
Balboa railroad shops	16, 654. 29	6, 094. 20		22, 748. 49
Cristobal shops	17, 546. 93	13, 346. 88		30, 893. 81
Equipment, Balboa	160, 017. 00	60, 031. 58	94, 906. 00	125, 142. 58
Equipment, Cristobal	96, 384. 02	29, 960. 41	8, 639. 66	117, 633. 77
Total	340, 730. 85	153, 201. 82	125, 805. 45	368, 127. 22
Fuel oil plants:				
Balboa:				
Pumping plant	22, 296. 61	4, 089. 72		26, 386. 33
Storage tanks	45, 261. 00	8, 818. 20		54, 079. 20
Pipe lines	47, 112. 71	18, 072. 78		63, 185. 49
Dock No. 4	132, 722. 11		79, 591. 57	53, 130. 54
Cristobal:				
Pumping plant	22, 242. 05	4, 224. 42		26, 466. 47
Storage tanks	51, 699. 32	15, 733. 02		67, 432. 34
Pipe lines	126, 690. 37	28, 857. 30		155, 547. 67
Total	446, 024. 17	79, 795. 44	79, 591. 57	446, 228. 04
General storehouses:				
Fixed property		28, 074. 00		28, 074. 00
Equipment	39, 141. 73	6, 611. 50	6, 432. 68	39, 320. 55
Total	39, 141. 73	34, 685. 50	6, 432. 68	67, 394. 55
Motor transportation division:				
Fixed property	11, 404. 56	5, 371. 70		16, 776. 26
Motor vehicles	49, 723. 39	53, 251. 43	53, 557. 49	49, 417. 33
Total	61, 127. 95	58, 623. 13	53, 557. 49	66, 193. 59
Motorcar repair shops:				
Fixed property	11, 069. 33	2, 712. 00		13, 721. 33
Equipment	4, 344. 42	3, 973. 25	1, 494. 19	6, 823. 48
Total	15, 353. 75	6, 685. 25	1, 494. 19	20, 544. 81
Building division:				
Fixed property	1, 421. 57	2, 106. 00		3, 527. 57
Equipment	43, 305. 50	5, 611. 69	1, 357. 29	47, 559. 90
Total	44, 727. 07	7, 717. 69	1, 357. 29	51, 087. 47
Panama Canal Press: Equipment	30, 592. 42	3, 500. 76	8, 603. 95	25, 489. 23
Gold quarters:				
Fixed property	2 1, 273. 19	165, 600. 00		24, 155. 47
New quarters, Balboa			15, 657. 70	
New quarters, Cristobal			41, 834. 67	
House No. 891-X, Balboa, purchase			3, 000. 00	
Alterations and improvements			79, 378. 97	
Total	2 1, 273. 19	165, 600. 00	139, 871. 34	24, 455. 47
Silver quarters:				
Fixed property	63, 100. 63	33, 536. 23		67, 758. 22
New quarters, La Boca			28, 878. 64	
Total	63, 100. 63	33, 536. 23	28, 878. 64	67, 758. 22
Garages:				
Fixed property	33, 749. 81	8, 595. 91		37, 699. 38
Additions, Balboa			3, 664. 93	
Additions, Gatun			981. 41	
Total	33, 749. 81	8, 595. 91	4, 646. 34	37, 699. 38
District quartermasters' supplies:				
Gasoline stations	5, 997. 45	2, 457. 00		8, 454. 45
Equipment	9, 673. 46	2, 208. 87	426. 46	11, 455. 87
Total	15, 670. 91	4, 665. 87	426. 46	19, 940. 32
Clubhouse business structures: Fixed property		20, 322. 84		20, 322. 84
Total, business divisions	2, 117, 981. 11	818, 180. 38	520, 771. 74	2, 445, 389. 75
Contingent balance	42, 759. 09	133. 50	2, 375. 99	40, 516. 60
Total reserve for replacements	3, 211, 044. 20	1, 161, 269. 12	675, 442. 47	3, 696, 870. 85
Total reserve for repairs (table No. 17)	392, 611. 81	655, 088. 01	652, 198. 69	395, 504. 13
Total reserve for leave 2 (table No. 18)	175, 537. 27	415, 767. 92	441, 031. 42	177, 273. 77
Total, funded reserves (table No. 27)	3, 779, 196. 28	2, 262, 125. 05	1, 771, 672. 58	4, 269, 648. 75

1 Indicates overexpenditure.

2 Less \$250,000.

ALPHABETICAL INDEX

	Page
Accidents, marine.....	43, 79
Accounts, payable (financial table No. 15).....	125
Accounts, receivable (financial table No. 10).....	122, 123
Accounting department:	
Accounting system.....	107, 108
Financial, including tables.....	107-140
Functions.....	63
Admeasurement of vessels. (See Measurement of vessels.)	
Administration:	
General.....	2
Organization.....	63, 64
Personnel, changes in.....	64, 65
Administration of estates.....	103
Aeronautical inspector, appointment of.....	65
Agriculture, experiment garden activities.....	74, 75
Agua-Clara filter plant, elimination of.....	79-81
Aids to navigation, lights, buoys, beacons, etc.....	42, 43
Aircraft, commercial aviation.....	104, 105
Air mail:	
Commercial aviation.....	104, 105
Postal system.....	100, 101
Reduction in rates.....	100
Albrook Field (Army flying field) construction of runways.....	93
Aliens. (See Employees, Employment, and Unemployed.)	
Allotments:	
Capital, 1940.....	79, 81
Financial tables.....	107, 140
Amusements and recreation.....	75-77
Ancon-Balboa, construction at.....	53
Ancon post office, new.....	99
Animal and motor transportation operations.....	57
Anniversary celebration, twenty-fifth, legislation.....	78
Annuities, optional retirement.....	78
Applications for positions:	
Applicants found eligible for employment, silver employees.....	71, 72
Eligibility procedure, silver employees.....	71, 72
Employment conditions on the Isthmus.....	65, 66
Appointment of midshipman to United States Naval Academy.....	78
Appointments, personnel. (See also Employment).....	64, 65
Apprentice-learner program.....	66
Appropriated funds (financial table No. 8).....	118-120
Appropriations:	
Financial tables.....	107-140
Ten-year construction program.....	81
Architectural and engineering design.....	82

	Page
Areas in the Canal Zone	85
Army vessels, repairs	49
Arrests, statistics	94, 95
Asphalt, rock, plant	93
Assets, capital (financial table No. 6)	116
Assistant, special, to Governor, appointed	64, 65
Athletic field, Balboa, fill between Panama Railroad tracks and Gaillard Highway	79, 81
Athletics	75-77
Atlantic locks overhaul	32, 33
Attendance at public schools, average daily	97, 98
Auditorium, memorial, legislation	78, 79
Automobiles:	
Deaths by accidents	95
License statistics	103
Aviation, commercial	104, 105
Balance of revenues and refundments (financial table No. 23)	134
Balance sheet (financial table No. 1)	110-112
Balances in appropriations and fund accounting ledger (financial table No. 27)	138, 139
Bald Rock Lighthouse established	42, 43
Ballast traffic	21-24
Beaching, emergency, site for, at East Culcra slide basin, special project No. 15	39
Beaching and mooring development at Gamboa, special project No. 14	39
Betterments:	
Ten-year construction program	81
Work in progress (financial table No. 12)	124
Births, vital statistics	87
Bitler, Lt. Comdr. Worthington S., appointed assistant to marine superintendent	64
Bona Island Lighthouse, relocation of	42, 43
Bridge, Cardenas River, rebuilding of	92, 93
Bubonic plague, control work for prevention of	89
Buildings:	
Additional needs	82
Capital allotment, fiscal year 1940	79-81
Construction, repair, and maintenance, various towns	53-56
Financial tables	107-140
General program	81, 82
Quarters for employees	53-56, 79
Business expenses, revenues, and profits or loss (financial table No. 26)	137
Business operations:	
Panama Canal:	
Building construction and maintenance	53-56
Electrical division	50
Fuel oil, Diesel, gasoline and kerosene	52
Mechanical and marine work	48-50
Motor and animal transportation	57
Obsolete and unserviceable property and equipment	52
Panama Canal Press	57
Purchases and inspections in the United States	51
Quarters for employees	53-56

Business operations—Continued.

Panama Canal—Continued.

Replacement of quarters for American employees.....	54-56
Revenues derived from rental of lands in Canal Zone.....	57, 58
Ship chandlery and other storehouse supplies.....	51, 52.

Panama Railroad:

Coal.....	59, 60
Commissary division.....	60, 61
Hotels.....	61
Lands and leases.....	60
Mindi dairy.....	62
Railroad.....	59
Real estate operations.....	60
Receiving and forwarding agency.....	59
Steamship line.....	62
Telephones and telegraphs.....	60

Equipment (financial table No. 5).....	116
--	-----

Financial tables.....	107-140
-----------------------	---------

Fixed property (financial table No. 4).....	114, 115
---	----------

Business, private, limited by new treaty between United States and Republic of Panama	101
---	-----

Canal. (*See* Panama Canal.)

Canal capacity, plans for increasing.....	77-80
---	-------

Canal earnings and expenses and net revenues (financial table No. 25) ..	135-137
--	---------

Canal record operations.....	57
------------------------------	----

Canal revenues (table No. 24).....	134
------------------------------------	-----

Canal traffic. (*See* Traffic.)

Canal transits, frequency of transit of vessels.....	25-27
--	-------

Canal Zone:

Area.....	85
-----------	----

Census, June 1939.....	86
------------------------	----

Vital statistics.....	87, 88
-----------------------	--------

Capacity of Canal, legislation, investigation, and plans for increasing.....	77-80
--	-------

Capital allotment, 1940.....	79-81
------------------------------	-------

Capital investment.....	107, 108, 124, 125
-------------------------	--------------------

Capital refundments (financial table No. 22).....	132, 133
---	----------

Capitalization, depreciation, and maintenance, financial tables.....	107, 140
--	----------

Cardenas River Bridge, replacement of.....	92, 93
--	--------

Cargo ships.....	21-23
------------------	-------

Cargoes:

Average tonnage, tolls, and tons of cargo per cargo-carrying vessel.....	24
--	----

Ballast traffic.....	21-24
----------------------	-------

Customs activities.....	102
-------------------------	-----

Laden traffic.....	21-24
--------------------	-------

Origin and destination.....	15-19
-----------------------------	-------

Principal commodities.....	20, 21
----------------------------	--------

Receiving and forwarding agency, Panama Railroad, operations.....	59
---	----

Tanker traffic.....	10-12
---------------------	-------

Tons of, by fiscal years.....	9
-------------------------------	---

Trade routes (statement).....	14-15
-------------------------------	-------

Traffic in 1939.....	5-28
----------------------	------

Cash relief for disabled employees.....	73, 74
---	--------

Cattle:	Page
Meat purchases, commissary division operations.....	61
Mindí dairy operations.....	62
Pasture areas in Canal Zone.....	85
Celebration, twenty-fifth anniversary, legislation.....	78
Census of Canal Zone June 1939.....	86
Channels, maintenance of, and special projects.....	36-39
Atlantic entrance, Cristobal Harbor and Gatun Lake.....	38
Gaillard Cut, maintenance and excavation.....	38
Pacific entrance, Balboa Harbor and Miraflores Lake.....	38
Special project No. 1, deepening Pacific entrance channel and Miraflores Lake channel.....	38
Special project No. 10, dredging south flare approach to Cristobal Inner Harbor.....	38
Special project No. 11, removing shoal areas, Cristobal Harbor.....	38, 39
Special project No. 13, widening Culebra reach, Gaillard Cut.....	39
Special project No. 14, combined mooring and beaching development, Gamboa.....	39
Special project No. 15, emergency beaching site, East Culebra Slide Basin.....	39
Cholera, Asiatic, spread of.....	89
Civil affairs division, activities.....	99-105
Classes of persons entitled to reside in Canal Zone and make purchases therein under terms of new treaty between United States and Republic of Panama.....	101
Classes, music, schools.....	99
Clubs and playgrounds divisions, functions and activities.....	75-77
Coaling plants; coal sales.....	59, 60
College, junior; problems and activities.....	97, 98
Colon (city) municipal improvements.....	93
Commercial traffic (Canal). (See Traffic, Canal.)	
Commissary division operations.....	60, 61
Complaints board.....	70
Consolidated statement of income, expenses, and net revenues (financial table No. 20).....	130
Construction and repair:	
Buildings and quarters.....	53-56
Mechanical division work for Panama Canal departments.....	49, 50
Convicts. (See Prisoners.)	
Corporations, foreign, licenses.....	104
Costs, capital investment.....	107, 108, 124, 125
Courses, extension, junior college.....	98
Courts, magistrates, activities.....	96
Credits, deferred (financial table No. 19).....	129
Cristobal, construction at.....	53
Cristobal, motor, car, repair shop.....	79, 81
Culebra, East, Slide Basin, emergency beaching site, special project No. 15.....	39
Culebra reach, Gaillard Cut, special project No. 13, widening.....	39
Custodial funds, receipts and disbursements (financial table No. 9).....	121, 122
Customs houses, Panamanian, in Canal Zone under terms of new treaty between United States and Republic of Panama.....	101
Customs operations (statement).....	102
Dailey, Col. Michael A., appointed superintendent of Gorgas Hospital.....	64
Dairies, milk production.....	62

	Page
Damage to vessels in Canal waters, legislation regarding payment of claims.....	79
Dams. (<i>See each</i> , as Gatun Dam, Madden Dam, etc.)	
Deaths:	
Administration of estates.....	103
Vehicle traffic accidents.....	94
Vital statistics.....	87, 88
Defense of Canal, providing for, and increasing capacity of Canal.....	83, 84
Deferred charges (financial table No. 13).....	124
Deferred credits (financial table No. 19).....	129
Deportations:	
Convicts and undesirables.....	95
Repatriation of unemployed aliens.....	72, 73
Depreciation, financial tables.....	107-140
Diesel oil. (<i>See Oil</i> .)	
Disabled employees, cash relief for.....	73, 74
Disbursements. (<i>See Expense</i> .)	
Diseases. (<i>See Vital statistics</i> .)	
Dispatching ships through Canal, hours of operation.....	30, 31
Dispensaries, patient days.....	89
Displacement tonnage, vessels paying tolls on.....	13
Dredging, special projects, channels, lakes, harbors, and cut.....	38, 39
Dredging division:	
Activities.....	36-42
Driftwood, disposal of, from Madden Lake area.....	41
Floating equipment employed.....	41, 42
Floating obstructions, including water hyacinths, removal of.....	41
Sand and gravel operations.....	40, 41
Driftwood, disposal of, from Madden Lake area.....	41
Drydocks:	
Business operations.....	48
Financial tables.....	107-140
Dry season, 1939 water supply.....	35, 36
Duties, customs, activities (statement).....	102
Earnings:	
Business operations, Panama Canal and Panama Railroad Co.....	47-62
Coal sales.....	59, 60
Commissary division operations.....	60, 61
Earnings and replacements.....	3, 4
Financial tables.....	107-140
Hotels.....	61
Land and land leases, Panama Railroad Co., real-estate operations....	60
Land licenses, Panama Canal.....	57
Milk production.....	62
Net revenues, Canal, 1939, Panama Railroad Co.....	107-112
Railroad.....	59
Receiving and forwarding agency.....	59
Telephones, electric clocks and electric printing telegraphs, gross revenue.....	60
Earthquakes.....	45
Education, public-school system.....	97-99
Electric light. (<i>See Electric power</i> .)	

	Page
Electric power:	
Additional electrical facilities on west side of Canal	80
Business operations	50
Canal operations, power for	33, 34
Financial tables	107-140
Hydroelectric stations operations	33, 34
Increasing capacity of Summit substation	80
Transmission-line interruptions	33, 34
Electrical division, business operations	50
Eligibility, number of silver applicants possessing	71, 72
Eligibility procedure, silver employees	71, 72
Employees:	
Cash relief for disabled employees	73, 74
Force employed, including distribution, recruiting, and turn-over	65-71
Services, special recognition, legislation	78
Superannuated native employees, Panama Railroad Co.	73, 74
Wage adjustments	69
Employment:	
Apprentice-learner program	66
Recruiting and turn-over, including force distribution and force employed	65-71
Repatriation of unemployed aliens	72, 73
Silver employment program	71, 72
Vacancies, filling with young United States citizens	66, 67
Engineering and architectural designing	82
Equipment (except floating and rolling):	
Business equipment (financial table No. 5)	116
Obsolete property and equipment, disposal of	52
Equipment, floating:	
Canal equipment (financial table No. 3)	114
Employed by the dredging division	41, 42
Repairs by mechanical division for Canal and Railroad	49, 50
Erbe, E. A., appointed special assistant to the Governor	64
Estates, administration of	103
Examinations for positions:	
Apprentice-learner program	66, 67
Eligibility procedure, silver employees	71, 72
Executive department:	
Aeronautical inspector, appointment of	65
Bureau of statistics abolished	65
Director of personnel, position established	64
Division of personnel administration, redesignated division of personnel supervision and management	65
Functions	63, 64
Property and requisition bureau abolished	65
Special assistant to Governor, appointed	64
Expenses and revenues. (See Revenues and expenses.)	
Experiment garden, botanical operations	74, 75
Extension courses, junior college	98
Ferry service and statistics	42
Fill, athletic field in Balboa between Panama Railroad tracks and Gaillard Highway	79, 81
Filter plant, Agua-Clara, elimination of	79-81
Filtration plants, maintenance	91

	Page
Financial and statistical tables and statements.....	107-140
Accounting system.....	107, 108
Capital account, Canal.....	107-112
List of financial tables.....	109, 110
Net revenues:	
Canal.....	107-112
Railroad.....	108
Fire and police division activities.....	94-96
Floating equipment. (<i>See</i> Equipment, floating.)	
Floods.....	35
Flying field, Albrook, Army, construction of runways.....	93
Food supplies, commissary division operations.....	60, 61
Force employed including distribution and turnover.....	65-71
Foreign corporations, licenses.....	104
Foreign naval vessels using Canal.....	13
Fort Davis cut-off, Bolivar Highway, north section.....	79, 81
Free transits, vessels entitled to.....	14
Fuel oil. (<i>See</i> Oil.)	
Fuel-oil plants, revenues.....	52
Funded reserve (financial table No. 27A).....	139, 140
Funds, financial tables.....	107-140
Gaillard Cut:	
Channel excavation.....	38
Special project No. 13, widening Culebra reach.....	39
Special project No. 15, East Culebra Slide Basin as emergency beach- ing site.....	39
Gamboa, mooring and beaching development, special project No. 14.....	39
Gamboa, construction at.....	53
Gamboa town site development.....	92
Gardens, experiment.....	74, 75
Gasoline, receipts and issues. (<i>See</i> Oil.)	
Gatun, construction of family quarters.....	53
Gatun hydroelectric station, operation.....	33, 34
Gatun Lake; channel excavation statistics.....	37, 38
Gatun locks, paint and carpenter shop.....	79, 81
Goethals, Maj. Gen. George W., memorial to.....	78
Government.....	85-105
Gravel plant, Gamboa, sand and gravel stock.....	40, 41
Harbors:	
Improvement and maintenance of Balboa and Cristobal Harbors....	38, 39
Special project No. 1, deepening Pacific entrance channel.....	38
Special project No. 10, dredging south flare approach to Cristobal Inner Harbor.....	38
Special project No. 11, removing shoal areas, Cristobal Outer Harbor..	38, 39
Harbor terminals, operations, fiscal years 1937, 1938, 1939.....	59
Health department:	
Curtailement of issue of land licenses in Canal Zone.....	57, 58
Functions of department.....	63, 64
Health conditions on the Isthmus.....	86, 87
Mortuary chapel in Corozal, erection of.....	53
Quarantine and immigration service.....	89, 90
Superintendent of Gorgas Hospital, appointed.....	64
Ward and superintendent's quarters, Palo Seco Leper Colony.....	53

	Page
<i>Henry S. Grove</i> , S. S., salvage work	43
Highways. (<i>See Roads.</i>)	
Hinners, Lt. Robert A., appointed assistant to superintendent, mechanical division	64
Homicides	94
Hospital, patient days	89
Hotels, operations	61
Hours of operation of Canal	30, 31
Humidity	45
Hyacinths, water, removal of from cut and lakes	41
Hydroelectric stations, operations	33, 34
Hydrology. (<i>See Meteorology.</i>)	
Immigration:	
Service operations	89, 90
Visas	101
Income. (<i>See Revenues.</i>)	
Increasing capacity of Canal:	
Capital allotment, 1940	79
Legislation	77-80, 83, 84
Plans for	83, 84
Special engineering section formed	83
Specialists employed	84
Increasing capacity of Summit substation	79, 80
Infants, vital statistics	87, 88
Inniss, Joseph, extension of Retirement Act to	79
Inspection:	
Fire protection	96
Purchase and inspection of material in the United States	51
Inspector, aeronautical, appointment of	65
Insurance, companies, licenses and statistics	104
Insured mail, Canal Zone postal system	100
Introduction, explanatory remarks and general statistics on operation of Canal	1-4
Investigations and plans for increasing capacity of Canal	80, 83, 84
Junior college, Canal Zone public school system	97, 98
Kerosene, receipts and issues. (<i>See Oil.</i>)	
Kindergartens	77
<i>Kinross</i> , S. S., assistance to	43
Labor. (<i>See Employees; Employment.</i>)	
Laboratory, municipal division testing	90, 91
Laden traffic	21-24
Lakes. (<i>See each, as Gatun Lake, Madden Lake, etc.</i>)	
Land:	
Areas in Canal Zone	85
Licenses in the Canal Zone	57-58
Panama Railroad leases	60
Rental revenues	57
Laws, Canal Zone:	
Enforcement, police division activities	94-96
Magistrates' courts, activities	96
Learnerships, program	66, 67
Leases, land, Panama Railroad operations	60

Legislation:	Page
Appointment of midshipman to United States Naval Academy.....	78
Extension of Retirement Act to W. E. Murtagh and Joseph Inmiss....	79
General.....	77-79
Memorial auditorium, builders of Canal.....	78, 79
Memorial, Goethals.....	78
Method to increase capacity of Canal.....	77-80, 83, 84
Optional retirement.....	78
Special recognition of services, civilian employees.....	78
Superannuation disability pay for native employees.....	73, 74
Twenty-fifth anniversary celebration.....	78
Liabilities, financial tables.....	107-140
Licenses:	
Foreign corporations.....	104
Insurance companies.....	104
Land licenses in force in Canal Zone.....	57
Peddlers.....	103
Ships' runners.....	103
Vehicles.....	103
Lighthouses. (See Lights and lighting.)	
Lights and lighting; marine.....	42, 43
Locks:	
Atlantic overhaul.....	32, 33
Investigations for increasing capacity of the Canal.....	77-80, 83, 84
Operations; hours:	
Atlantic locks.....	31
Pacific locks.....	31
Third set, legislation pertaining to.....	77, 78, 80
Lockages and lock maintenance.....	31, 32
Madden Dam:	
General.....	36
Uplift pressure.....	36
Madden hydroelectric station operations.....	33
Madden Lake, filling elevation.....	36
Magistrates' courts, activities.....	96
Mail:	
Commercial aviation.....	104, 105
Postal system in Canal Zone.....	99-101
Malaria rate.....	88
Marine division:	
Accidents to shipping.....	43
Activities.....	42, 43
Aids to navigation.....	42, 43
Appointment of assistant to marine superintendent vice Lt. Harold C. Patton.....	64
Salvage and towing operations.....	43
Marine work, repairs to vessels.....	49
Material and supplies:	
Financial table No. 11.....	123
Obsolete property and equipment, disposal of.....	52
Purchases and inspections in the United States.....	51
Ship chandlery.....	51, 52
Measurement of vessels, revised measurement rules for transiting vessels..	30
Meat purchases, commissary division activity.....	61

	Page
Mechanical division:	
Appointment of assistant to the superintendent.....	64, 65
Business operations.....	48, 49
Drydocks.....	48, 49
Financial.....	48
Plant improvement.....	50
Vessels, repairs.....	49
Work other than marine.....	49, 50
Memorial auditorium, builders of the Panama Canal.....	78, 79
Memorial, Goethals.....	78
Meteorology, hydrology, and seismology:	
Air temperatures.....	44
Precipitation, calendar year 1938.....	44
Seismology.....	45
Tides.....	45
Winds and humidity.....	45
Midshipman, appointment to United States Naval Academy.....	78
Milk bottling plant operations, commissary division.....	62
Mindi dairy operations.....	63
Miraflores Diesel electric station operations.....	33
Miraflores Lake:	
Excavation statistics.....	38
Special project No. 1, deepening channel to Pacific entrance.....	38
Money orders, Canal Zone system.....	99
Mooring and beaching development at Gamboa.....	39
Motor transportation division:	
Cristobal motor-car repair shop.....	79, 81
Operations.....	57
Municipal engineering division.....	90-93
Murtagh, W. E., extension of Retirement Act to.....	79
Music, Canal Zone schools.....	99
Nationality of vessels using Canal.....	12
Naval Academy, United States, appointment of Canal Zone youths.....	78
Naval vessels, foreign:	
Repairs.....	49
Transits.....	13
Navigation, aids to. (See Aids to navigation.)	
Obstruction to navigation, removal of, by dredging division.....	39-41
Office engineer, activities.....	82
Oil:	
Fuel and Diesel, gasoline and kerosene, receipts and issues.....	52
Fuel-oil plants, revenues.....	52
Tanker traffic in 1939.....	10-12
Operation and maintenance of Canal:	
Auxiliary enterprises.....	2
Business operations.....	47-62
Explanatory remarks.....	1-4
Financial tables.....	107-140
Operation and maintenance, department of:	
Appointment of assistant engineer of maintenance.....	65
Functions.....	63, 65
Order, public, police division activities.....	94, 95
Ore ships.....	22, 23

Organization (<i>see also</i> under each):	Page
Appointments.....	64, 65
Changes in administration.....	65
Changes in personnel.....	64, 65
Departments.....	63-65
Force employed, including distribution, recruiting, and turn-over.....	65-71
General remarks.....	63-65
Overhaul, Atlantic locks.....	32, 33
Palo Seco Leper asylum, additional buildings proposed, 1940 allotment...	79, 80
Panama Canal:	
Auxiliary enterprises.....	2
Business operations.....	47-62
Capacity increase investigation.....	77-80, 83, 84
Capital investment.....	107, 108, 124, 125
Financial tables.....	107-140
Hours of operation.....	30, 31
Net revenues, 1939.....	107, 108, 111
Operation and maintenance, explanatory remarks.....	1-4
Operation and trade (<i>see also</i> under each subject).....	5-45
Panama Canal record operations.....	57
Panama Canal press operations.....	57
Panama City municipal improvements.....	93
Panama Railroad Co.:	
Business operations.....	58-62
Financial tables.....	107-140
Functions of department.....	63, 64
Net revenues, 1939.....	108
Real estate section.....	58, 60
Superannuated native employees.....	73, 74
Panama Republic relations with the Panama Canal.....	101, 102
Parcel post, Canal Zone postal system.....	100
Pardon board activities.....	97
Passenger ships.....	22, 23
Passengers:	
Aviation.....	104, 105
Ships, summary of movement at Canal in 1939.....	29, 30
Pasture areas in Canal Zone.....	85
Patton, Lt. Harold C., United States Navy, relieved from duty in marine division.....	64
Paul, Seymour, appointed director of personnel.....	64
Pay, rates of, adjustments.....	69
Payments, annual, to Republic of Panama under terms of new treaty....	101
Peddler, licenses.....	103
Pedro Miguel, construction at.....	53
Personnel:	
Appointment of officials.....	64, 65
Apprentice-learner program.....	66, 67
Changes in personnel.....	64, 65
Force employed, including distribution, recruiting, and turn-over....	65-71
Personnel administration functions.....	66, 67
Trainees, appointment of.....	66, 67
Wage adjustments.....	69
Personnel supervision and management division, redesignation of.....	65

	Page
Persons entitled to reside in Canal Zone and make purchases therein under terms of new treaty between United States and Republic of Panama	101
Pipe lines (water), maintenance	91
Plans section, activities	65, 83
Playgrounds. (See Clubs and playgrounds.)	
<i>Point Vincente</i> , S. S., repair work on	43, 49
Police and fire division activities	94-96
Population of Canal Zone, June 1939	86
Post office, Ancon, new	99
Posts, division of, activities	99-101
Postal system in the Canal Zone	99-101
Power. (See Electric power.)	
Precipitation, calendar year 1938	44
Printing plant operations	57
Prisoners:	
Committed to penitentiary	95
Deportations	95
Labor	94, 95
Magistrates courts, activities	96
Pardons and reprieves	97
Serving sentences	94
Profits, financial tables	107-140
Property:	
Business fixed property (financial table No. 4)	114-115
Canal fixed property (financial table No. 2)	112-114
Damage by fire	96
Obsolete property and equipment, disposal of	52
Property and requisition bureau abolished	65
Public health; conditions on the Isthmus	86, 87
Public order, police division activities	94, 95
Public-school system, Canal Zone	97-99
Public works, Panama and Colon cities (financial table No. 7)	117
Purchases and inspection of material in the United States	51
Quarantine service	89-90
Quarry, Sosa Hill, and rock-crushing plant	93
Quarters (buildings). (See Buildings.)	
Quarton, Lt. Comdr. Dale, relieved from duty in mechanical division	64
Railroad. (See Panama Railroad.)	
Rainfall	44
Ratification of Treaty between United States and Republic of Panama	101
Real estate. (See Land.)	
Recruiting and turn-over of force, including force employed	67-69
Reduction, air-mail postage rate	100
Registered mail, Canal Zone postal system	100
Relations with Republic of Panama	101, 102
Relief, cash, for disabled employees	73, 74
Rental payments, annual, to Republic of Panama under terms of new Treaty	101
Rents. (See Leases.)	
Repair parts, manufacture of, 1939 Atlantic lock overhaul	50
Repairs:	
Buildings and quarters	53-56
Mechanical division work for Canal and railroad divisions	49, 50
To vessels	49

	Page
Repatriation of unemployed aliens	72, 73
Replacement needs, clubhouse	76
Replacements:	
Financial tables Nos. 16 and 17	126-128
General	3-4
Old clubhouses	76
Ten-year construction program	81, 82
Reports, financial tables	107-140
Reserves:	
For repairs (financial table No. 17)	128
For replacement (financial table No. 16)	126-128
For vacation pay (financial table No. 18)	128, 129
Reservoirs, maintenance	91
Retirement:	
Legislation	78
Superannuation of native employees	73, 74
Revenues and expenses:	
Business operations	47-62
Coal sales	59, 60
Commissary division operations	60, 61
Financial tables	107-140
General	3
Hotels	61
Land leases, Panama Railroad Co.	60
Land rentals, Canal	57, 58
Mechanical division, gross revenues	48
Milk production	62
Net revenues, Canal, 1939	107-112
Net revenues, Railroad, 1939	108
Panama Canal Press	57
Railroad (statistical)	59
Receiving and forwarding agency, Panama Railroad Co.	59
Revenues and expenses, computed surplus (financial table No. 21) ..	131, 132
Storehouse operations	51, 52
Telephones, electric clocks, and electric printing telegraphs	60
Richardson, Col. William, relieved from duty	64
Roads:	
Fort Davis cut-off, Bolivar Highway, north section	79, 81
Tivoli Crossing to Caledonia crossing, new street	79, 80
Trans-Isthmian Highway proposed in new Treaty between United States and Republic of Panama	101, 102
Widened, constructed, renewed, etc., at various points	92
Rock-crushing plant, Sosa Hill Quarry	93
Roosevelt, President, visit of	84
Runways, constructed at Albroom Field (Army flying field)	93
Salary board, activities	70
Sales to vessels:	
Commissary supplies	60, 61
Sales restrictions	60
Ship chandlery	51, 52
Salvage operations, marine division	43
Sand and gravel stock pile	40
Sanitation, health conditions on the Isthmus	86, 87

	Page
Schools, activities of public-school system.....	97-99
Scrap sales	52
Seamen, shipping commissioner operation	102, 103
Seismology.....	45
Services to shipping, general.....	2, 3
Services to vessels:	
Agency services, Panama Railroad Co	59
General.....	2, 3
Ship-chandlery operations.....	51, 52
Sewers:	
Maintenance, repairs and renewals	92
Panama and Colon improvements.....	93
Ship accidents. (<i>See</i> Accidents, marine.)	
Ship chandlery	51, 52
Ship runners, licenses.....	103
Shipping commissioner, activities	102, 103
Shops:	
Paint and carpenter shop, Gatun Locks.....	79, 81
Plant improvements, mechanical division.....	50
Sickness. (<i>See</i> Health department.)	
Sidewalks, maintenance.....	92
Silver personnel, general (<i>see also</i> Employees).....	70, 71
Slides.....	39, 40
Smith, Jr., Capt. Frederic H., United States Army, relieved from duty ..	65
Sommers, Capt. Charles, United States Army, appointed aeronautical inspector.....	65
Sosa Hill quarry and rock-crushing plant.....	93
Statistics, bureau of, abolished.....	65
Statistics, financial tables.....	107-140
Storehouses:	
Fuel and Diesel oil, gasoline, and kerosene, operations.....	52
Obsolete property and equipment, disposal of.....	52
Revenues.....	52
Ship chandlery and other storehouse supplies.....	51, 52
Streets. (<i>See</i> Roads.)	
Styer, Lt. Col. Wilhelm D., relieved from duty.....	65
Suicides.....	94
Summit substation, increasing capacity.....	79, 80
Superannuation of native employees, including statistics.....	73, 74
Superintendent of Gorgas Hospital, appointed.....	64
Supply department, functions.....	63
Surplus, financial tables.....	107-140
Tank ships.....	22, 23
Tanker traffic:	
Number and daily average transits.....	11
Proportion of tanker and general net tonnage.....	11
Proportion of tolls from tankers and others.....	12
Taxes. (<i>See</i> Licenses.)	
Telephones and telegraphs, business operations, Panama Railroad Co.....	60
Temperatures, air.....	44
Tests:	
Municipal division laboratory operations.....	90, 91
Standard achievement, schools.....	98
Tides.....	45

	Page
Tivoli Hotel, operations.....	61
Tolls:	
Average per cargo-carrying vessel.....	24
Free transits, vessels entitled to.....	14
New Panama Canal rules.....	30
Proportion from tankers and others.....	12
Tonnage. (See Traffic, Canal.)	
Town sites, Gamboa development.....	92
Trade routes.....	14, 15
Traffic, Canal:	
Average tonnage, tolls, and tons of cargo per cargo-carrying vessel.....	24
By fiscal years.....	9
By months.....	10
Classification of vessels.....	21-24
Displacement tonnage.....	13
Foreign naval vessels.....	13
General statistics.....	5-28
Nationality of vessels: Ocean-going vessels, tonnage and tolls.....	12
Origin and destination.....	15-19
Passengers, summary of movement at Canal, 1939.....	29, 30
Principal commodities.....	20, 21
Small commercial.....	14
Steam, motor, and other vessels.....	25
Tankers:	
Number and daily average transits.....	11
Proportion of tanker and general net tonnage.....	11
Proportion of tolls from tankers and other vessels.....	12
Tolls.....	9
Tonnage, gross, of vessels.....	27, 28
Trade routes.....	14, 15
Transit frequency of vessels.....	25-27
Traffic regulation violations (statistics).....	95
Training program, in-service.....	66
Trans-Isthmian highway, proposed in new treaty between United States and Republic of Panama.....	101, 102
Transportation:	
Motor and animal transportation operations.....	57
Repatriation of unemployed aliens.....	72, 73
Treaty between United States and Republic of Panama, ratification of.....	101
Typhus fever.....	90
Undesirables, deportations.....	95
Vessels:	
Accidents. (See Accidents, marine.)	
Agency services, Panama Railroad Co.....	59
Customs activities.....	102
Repairs.....	48-49
Shipping commissioner activities.....	102, 103
Visas, immigration.....	101
Visit of President Roosevelt.....	84
Vital statistics.....	87, 88
Wage adjustments.....	69
Wage board membership.....	69
Wages, silver.....	71

	Page
Ward buildings, Palo Seco, construction of	53, 79, 80
Washington Hotel operations	61
Water areas in the Canal Zone	85
Water lines, maintenance	91
Water supply:	
Dry season, 1939	34, 35
Floods	35
Gatun Lake source	34, 35
Madden Lake	36
Panama and Colon public works (financial table No. 7)	117
System, including maintenance	91, 92
Weart, Lt. Col. Douglas L., appointed assistant engineer of maintenance	65
Winds	45
Work in progress (financial table No. 12)	124
Yellow fever, jungle type	89



UNIVERSITY OF FLORIDA



3 1262 08300 703 8

SCI-HSSL

386
P187

